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ABSTRACT

In an effort to identify and assess the social, economic, and political effects of nuclear power plant construction and operation upon two host communities (Plymouth, Massachusetts and Waterford, Connecticut), a post-licensing review revealed that the primary impact of the nuclear power plants in both communities was an increase in the property tax base. Each community chose to maintain or reduce the existing tax rate while using the additional revenue to significantly increase and enhance public service delivery systems and facilities. Over the five year period, education's share of Waterford's budget fell from 63% to 55%, while Plymouth's share rose from 35% to 43%. However, in per capita terms, the rates of increase were nearly identical, with each rounding to 72%. Indirect consequences of the fiscal impact were professionalization of administrative infrastructure, increase in the salience of growth issues, and alteration of both inter- and intra-community relationships. In retrospect, most residents would permit construction of the nuclear facilities because of the economic benefits and the lack of perceived disbenefits. The report includes: discussions of the study purpose, design, and objectives; profiles of the two communities; results of interviews with local decision makers and attitude surveys of a random sampling of citizens from each community; summaries of study findings and suggestions for future research; references; and appendices listing interviewees and survey questions and results. (Author/NEC)

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A Post Licensing Study of Community Effects at Two Operating Nuclear Power Plants

Final Report

Bruce J. Purdy
Elizabeth Peelle
Benson H. Bronfman
David J. Bjornstad

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A POST LICENSING STUDY OF COMMUNITY EFFECTS AT TWO OPERATING NUCLEAR POWER PLANTS

Final Report

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Chapter 1: Benson Bronfman
Chapter 2: Benson Bronfman and Bruce Purdy
Chapter 3: Bruce Purdy and Elizabeth Peelle
Chapter 4: Bruce Purdy, David Bjornstad, and Elizabeth Peelle
Chapter 5: Benson Bronfman

In conclusion, the authors wish to thank the citizens of the towns of Plymouth and Waterford for their continual cooperation and hospitality during our visits to their respective communities.

ABSTRACT

This report describes the results of an exploratory assessment of the social, economic, and political impacts of two operating nuclear power facilities on two New England communities through 1975. This work is one of a series planned to broaden knowledge of the effects of large energy generating facilities upon host communities.

The report includes discussions of the study purpose, design, and objectives; profiles of the towns of Plymouth, Massachusetts and Waterford, Connecticut; and an assessment of the social, economic, and political impacts at both sites during both construction and operating phases. Results of attitude surveys conducted for each community are presented. Study findings and suggestions for future research are summarized.

The study concludes that construction impacts were minor due to a dispersed commuting pattern of construction workers. The primary impact of the nuclear power plants in both communities was an increase in the property tax base. Each community chose to maintain or reduce the existing tax rate while using the additional revenue to significantly increase and enhance public service delivery systems and facilities within the community. Indirect consequences of this fiscal impact were: (1) professionalization of administrative infrastructure, (2) an increase in the salience of growth issues, and (3) alteration of both inter- and intra-community relationships. Asked how they would decide now (knowing what they know now), most residents would permit construction of the nuclear facilities because of the economic benefits and the lack of perceived disbenefits.

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1. INTRODUCTION

1.1 Purpose of the Study

The purpose of this study is to investigate and assess the social and economic impacts on people and their communities resulting from the construction and operation of nuclear power plants. The study consists of a post-licensing review of the effects of two nuclear plants on their host communities through 1975.

The primary impetus for this study arises from the precedents set forth in Section 102 of PL 91-190 of the National Environmental Policy Act of 1969 (NEPA) and the need to expand environmental impact statement assessments beyond the bio-physical environment to the social environment. The noticeable lack of information in early statements about impacts upon people inspired discussions between the Atomic Energy Commission (AEC) and the Oak Ridge National Laboratory (ORNL) staffs during the period 1972-1974. One result was the decision to conduct an exploratory analysis of nuclear host communities with the broad goal of investigating the entire range of measurable socio-economic impacts that might occur with such communities. This paper reports on this initial investigation.

1.2 Scope of the Study

This study was designed to identify and assess the social and economic effects of nuclear power plant construction and operation upon two host communities: Plymouth, Massachusetts and Waterford, Connecticut. To achieve these goals, two decisions were made at the outset: first, to use a field study approach, and second, to limit the analysis, as much as possible, to impacts upon communities.

Field studies are defined as "*ex post facto* scientific inquiries aimed at discovering the relations and interactions among . . .variables in real social structures."[1] The *post facto* field study approach was chosen because of data and information constraints. One such constraint, for example, was the absence of precise information as to the pre-construction situation in the communities — a fact which precluded the use of other designs, such as pre-post or time-series analysis. Little assistance was provided by early environmental impact statements, where attempts at social impact assessments were typically crude and superficial.

There are both advantages and disadvantages to our approach. On the positive side, field studies are important in that they can examine many variables and their inter-relationships in a "real-world," ongoing social context. As nuclear power plants may impact a variety of existing structures and relationships, the field study provides one of the best approaches available to the researcher to examine the outcomes of the process. On the negative side, the ex post facto nature of the effort, as well as the field situation, complicates attribution of changes to any specific cause (i.e., the nuclear power plant). Changes arising from other independent but unexamined or unmeasured variables at work in a field setting may give rise to equally valid, competing explanations.

Despite their disadvantages, field studies are often employed in social science research and are generally of two types: exploratory and hypothesis testing.[2] An exploratory field study, such as this study, seeks to discover significant variables and their inter-relationships for the purpose of setting a base for future research. Although hypothesis testing is an important goal of social science research, it should be recognized that there are many preliminary steps to hypothesis testing,[3] and this study represents one such step. In sum, the analytical limitations of post facto analysis[4] must be weighed against the purposes of the study and recognized at the outset.

Focus was placed upon the community as the unit of analysis for many reasons. First, the research interests were not concerned so much with issues of broad social change, but rather with site-specific problems which might require planning or mitigation. Second, it was felt that many social impacts would be masked when aggregated to the region, ignoring a segment of the population most directly impacted by their physical proximity to the plant. Third, the community social and political literature was more highly developed than the regional equivalent, and thus provided a richer background to draw upon. Finally, it was felt that the definition of what constitutes an appropriate region, and the data and methodological problems associated with that type of research were beyond the state of the art of social impact assessment, and were best left for future research. The analysis was, for the most part, confined to the (geopolitical) boundaries of the communities themselves. Where possible, however, attempts were made to extrapolate to the region, or to place the community impacts within the context of larger regional trends.

1.3 A Social Impact Assessment Model

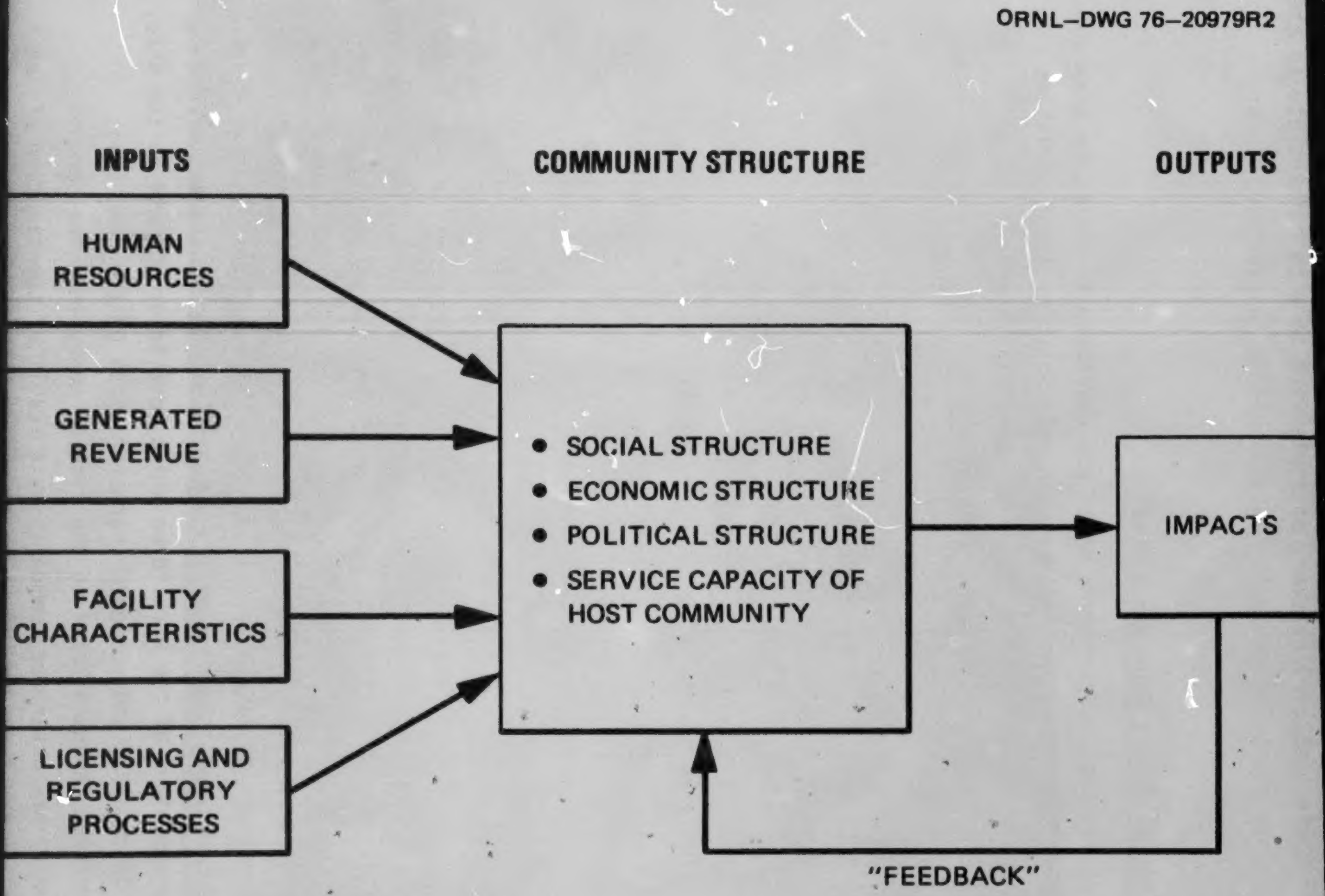
A social impact assessment model was developed to structure data and information requirements and to suggest relationships among variables which were amenable to empirical testing. As shown in Figure 1, the model is composed of three distinct components: inputs, community structure, and outputs.

Inputs are defined as those technology-related factors which are introduced to the community solely as a result of the planning, construction, and operation of the facility. Four general classes of inputs have been defined: (1) human resources, (2) generated revenues, (3) facility characteristics, and (4) the licensing and regulatory process. Obviously, the relative importance of these inputs varies from case to case. However, the presence or absence of inputs, the magnitude of inputs and the relative mix of inputs, act as a stimulus for change within the community, resulting in site-specific social impacts.

Human resources refers to the labor force involved in the construction and operation of the facility. The effects of a construction labor force influx have been noted extensively elsewhere, particularly as the "boomtown effect" observed in western coal towns.[5] The impacts upon population, employment, and public services may be very significant during the construction period.

For nuclear plants, the construction worker labor force is significantly (at least 10 times) larger than the operating force and has differing impacts on host communities. The course of impacts differs according to the proportions of the work force which move in or commute to the site, and the demographic and economic characteristics of the in-movers.

Generated revenues refer to the flow of money into the community. These monies may enter the community as a result of the taxation of the facility, or the goods and services purchased within the community. In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INPUTS
COMMUNITY STRUCTURE
OUTPUTS
HUMAN RESOURCES
GENERATED REVENUE
FACILITY CHARACTERISTICS
LICENSING AND REGULATORY PROCESSES
• SOCIAL STRUCTURE
• ECONOMIC STRUCTURE
• POLITICAL STRUCTURE
• SERVICE CAPACITY OF HOST COMMUNITY
IMPACTS
"FEEDBACK"

Fig. 1. Social Impact Assessment Model.

the absence of a large community-based labor force, tax revenues play an extremely important role in shaping community responses, and thus structuring the type and magnitude of impacts.

Facility characteristics refer to the physical plant, the type and amount of land occupied. transmission corridors, cooling systems, discharge canals, and other facilities such as administration buildings and visitors centers. Facility characteristics may be an important input to the community in that land-use patterns may be changed and community aesthetics may be altered.

The licensing and regulatory process includes all legal requirements and formal institutional arrangements necessary for the construction and operation of the facility. Most importantly, the process, as it currently exists, serves as a forum for supporters and opponents to make their concerns known, and as an open review of the applicant's claims regarding social, economic, and environmental impacts. The range of community impacts, as applied to our selected cases, is discussed in Chapter 2.

The second component of the model — community structure — refers to the social, economic, and political structure of the community, and to the general service capacity of the community. While these general categories are not exhaustive of what are generally considered to be structural components of communities, they serve here as examples of where the emphasis will be placed in describing the communities, and are suggestive of the general content of empirical analyses. The community context of our selected cases will be described in Chapter 3.

As the model is described, inputs interact with the community structure, resulting in our third general component, outputs, or impacts. Impacts can be described as "primary" or "secondary" mainly in a temporal framework. Thus, an increased property tax base (primary impact) may result in a lowering of the tax rate (secondary impact). Implicit in the model is a "feedback" loop, indicative of the fact that impacts, both primary and secondary, may affect the community context, altering specific structures, and the way in which succeeding inputs are handled. Exogenous to the model are regional and national trends — political and economic — as well as changes in siting and energy development policies. The "outputs" or "impacts" resulting from facilities in our communities will be addressed in Chapter 4.

1.4 Selection of Candidate Sites

Candidate sites were selected to include those which were believed to have experienced significant socioeconomic impacts from the construction or operation of nuclear power plants. For example, we selected privately-owned utilities to incorporate fiscal impacts, as no taxes are paid on publicly-owned facilities. Since we were studying impacts after the fact, we selected communities which were hosts to power reactors for at least three years, a minimum time frame for tracing post-operation impacts, in our judgment. Of the 53 power reactors licensed for operation by December 1974, 18 had been licensed for three or more years, as shown in Table 1. Eliminating small early reactors, many of which had been experimental, nine reactors of at least 500 Mwe capacity remained. These nine reactors and their host communities were reviewed. On the basis of this review, Plymouth, Massachusetts and Waterford, Connecticut were selected because of prior socioeconomic similarities between them and a possible broad range of impacts from the plant siting and operation, as suggested by early community contacts.

From Tables 2 and 3, one can see that the two sites were similar in preconstruction population, seacoast location, political structure, percentage of the tax base provided by the utility, and certain reactor characteristics. They were dissimilar in subsequent rates of population growth, population density, median income, use of planning and zoning to control growth, and the amount of additional nuclear reactor construction under way.

1.5 Data Collection

For this exploratory study, the emphasis was placed on variables that were easily measured, rather than on more subtle variables which would have required longer series or more involved statistical procedures. The data base, developed by the study team during extended visits to the towns of Plymouth and Waterford and nearby areas, included personal interviews, public records, and attitude surveys. Each type of data was used for specific purposes. From February to August 1975, we observed and recorded activities and events occurring within the two communities.

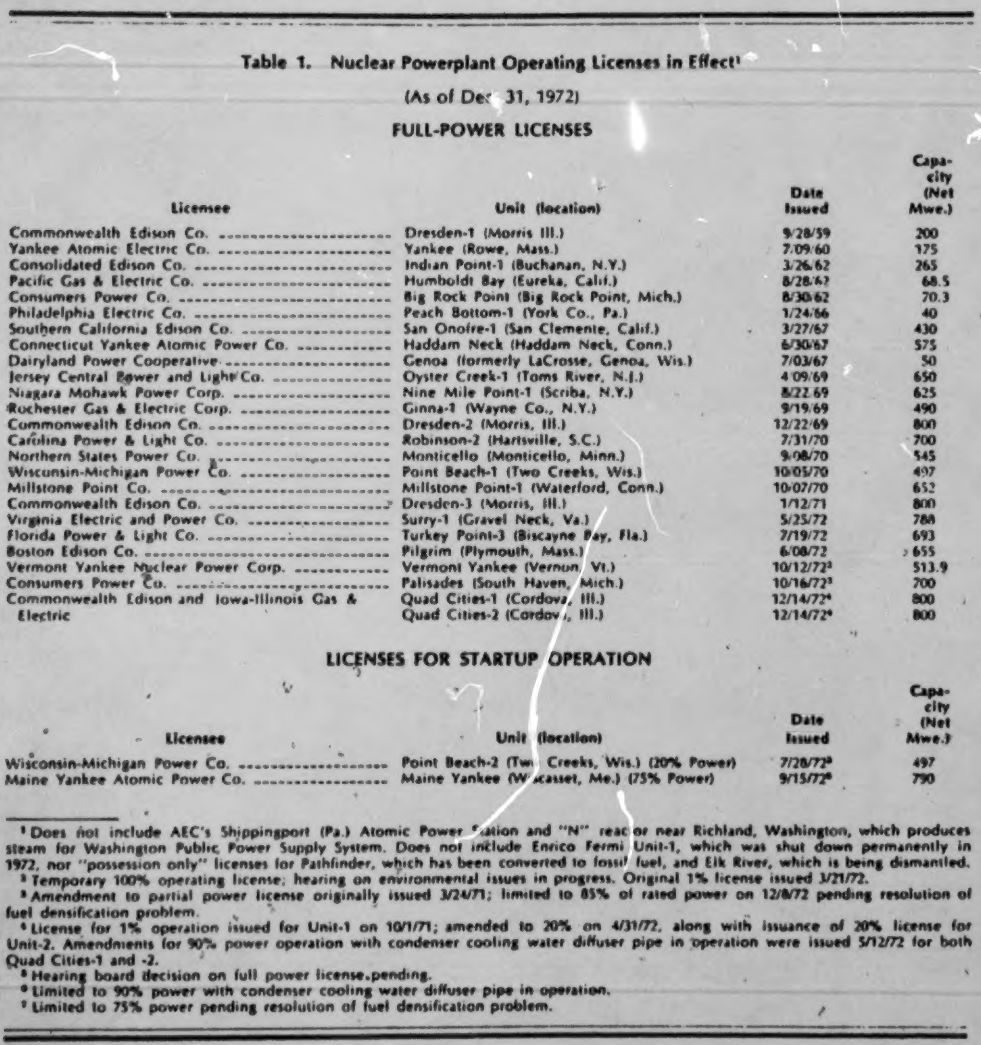

Table 1. Nuclear Powerplant Operating Licenses in Effect[1]

(As of Dec. 31, 1972)

FULL-POWER LICENSES

Licensee	Unit (location)	Date Issued	Capacity (Net Mwe.)
Commonwealth Edison Co.	Dresden-1 (Morris Ill.)	9/28/59	200
Yankee Atomic Electric Co.	Yankee (Rowe, Mass.)	7/09/60	175
Consolidated Edison Co.	Indian Point-1 (Buchanan, N.Y.)	3/26/62	265
Pacific Gas & Electric Co.	Humboldt Bay (Eureka, Calif.)	8/28/62	68.5
Consumers Power Co.	Big Rock Point (Big Rock Point, Mich.)	8/30/62	70.3
Philadelphia Electric Co.	Peach Bottom-1 (York Co., Pa.)	1/24/66	40
Southern California Edison Co.	San Onofre-1 (San Clemente, Calif.)	3/27/67	430
Connecticut Yankee Atomic Power Co.	Haddam Neck (Haddam Neck, Conn.)	6/30/67	575
Dairyland Power Cooperative	Genoa (formerly LaCrosse, Genoa, Wis.)	7/03/67	50
Jersey Central Power and Light Co.	Oyster Creek-1 (Toms River, N.J.)	4/09/69	650
Niagara Mohawk Power Corp.	Nine Mile Point-1 (Scriba, N.Y.)	8/22/69	625
Rochester Gas & Electric Corp.	Ginna-1 (Wayne Co., N.Y.)	9/19/69	490
Commonwealth Edison Co.	Dresden-2 (Morris, Ill.)	12/22/69	800
Carolina Power & Light Co.	Robinson-2 (Hartsville, S.C.)	7/31/70	700
Northern States Power Co.	Monticello (Monticello, Minn.)	9/08/70	545
Wisconsin-Michigan Power Co.	Point Beach-1 (Two Creeks, Wis.)	10/05/70	497
Millstone Point Co.	Millstone Point-1 (Waterford, Conn.)	10/07/70	652
Commonwealth Edison Co.	Dresden-3 (Morris, Ill.)	1/12/71	800
Virginia Electric and Power Co.	Surry-1 (Gravel Neck, Va.)	5/25/72	788
Florida Power & Light Co.	Turkey Point-3 (Biscayne Bay, Fla.)	7/19/72	693
Boston Edison Co.	Pilgrim (Plymouth, Mass.)	6/08/72	655
Vermont Yankee Nuclear Power Corp.	Vermont Yankee (Vernon, Vt.)	10/12/72[2]	513.9
Consumers Power Co.	Palisades (South Haven, Mich.)	10/16/72[3]	700
Commonwealth Edison and Iowa-Illinois Gas & Electric	Quad Cities-1 (Cordova, Ill.)	12/14/72[4]	800
	Quad Cities-2 (Cordova, Ill.)	12/14/72[4]	800

LICENSES FOR STARTUP OPERATION

Licensee	Unit (location)	Date Issued	Capacity (Net Mwe.)
Wisconsin-Michigan Power Co.	Point Beach-2 (Two Creeks, Wis.) (20% Power)	7/28/72[5]	497
Maine Yankee Atomic Power Co.	Maine Yankee (Wiscasset, Me.) (75% Power)	9/15/72[6]	790

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[1] Does not include AEC's Shippingport (Pa.) Atomic Power Station and "N" reactor near Richland, Washington, which produces steam for Washington Public Power Supply System. Does not include Enrico Fermi Unit-1, which was shut down permanently in 1972, nor "possession only" licenses for Pathfinder, which has been converted to fossil fuel, and Elk River, which is being dismantled.

[2] Temporary 100% operating license; hearing on environmental issues in progress. Original 1% license issued 3/21/72.

[3] Amendment to partial power license originally issued 3/24/71; limited to 85% of rated power on 12/8/72 pending resolution of fuel densification problem.

[4] License for 1% operation issued for Unit-1 on 10/1/71; amended to 20% on 4/31/72, along with issuance of 20% license for Unit-2. Amendments for 90% power operation with condenser cooling water diffuser pipe in operation were issued 5/12/72 for both Quad Cities-1 and -2.

[5] Hearing board decision on full power license pending.

[6] Limited to 90% power with condenser cooling water diffuser pipe in operation.

[7] Limited to 75% power pending resolution of fuel densification problem.

Source: *1972 Atomic Energy Programs: Regulatory Activities*, U.S. Atomic Energy Commission.

Table 2

Selected Community Characteristics: Plymouth, Massachusetts and Waterford, Connecticut

Community Characteristics	Plymouth, Massachusetts	Waterford, Connecticut
Location:	Southeastern Massachusetts Plymouth County Approximately 40 miles from Boston, Massachusetts, and 40 miles from Providence, Rhode Island Coastal: situated on Cape Cod Bay	Southeastern Connecticut New London County Approximately 40 miles from Hartford and New Haven, Connecticut Coastal: situated on Long Island Sound
Land Area:	104 sq. mile	37 sq. mile
Population Density (1970):	191/sq. mile	467/sq. mile
Type of Government:	Representative Town Meeting	Representative Town Meeting
Preconstruction Population (1965):	15,400	16,600
Post-construction Population (1975) (estimated):	28,000	18,300
Percent Increase in Population, 1965-1975	82%	10%
Zoning and Planning Capabilities:	Few effective zoning regulations until 1973	Effective planning and zoning regulations administered since the 1960s
Approximate Percentage of Tax Base Supplied by the Nuclear Reactor - 1973:	50%	60%
Median Income (1970):	$7,900	$11,828

Source: Plymouth, Massachusetts, and Waterford, Connecticut, Annual Reports, 1970-1974; U.S. Census of the Population, Massachusetts and Connecticut, 1970.

Table 3

Reactor Characteristics: Pilgrim Unit I and Millstone Units I and II

	Pilgrim Unit I	Millstone Unit I	Millstone Unit II
Location:	Plymouth, Massachusetts	Waterford, Connecticut	Waterford, Connecticut
Utility:	Boston Edison	Northeast Utilities	Northeast Utilities
Size:	670 MWe	652 MWe	828 MWe
Type:	Boiling Water	Boiling Water	Pressurized Water
Cooling:	The station draws salt water from Cape Cod Bay for a condenser cooling water system (approximately 310,000 gpm) and for service water systems cooling water (approximately 10,000 gpm) and returns this water to Cape Cod Bay through a discharge channel about 900 feet to the north of the station. The temperature of the returned water is about 29°F above inlet temperatures.	The once-through cooling system draws water from Niantic Bay through two pump houses and discharges it into a quarry which is approximately 100 feet deep. The water then flows over a weir into a shoreline discharge on the east side of Millstone Point. The temperature of returned cooling water is about 23° F. above that of the bay.	(same as Millstone I)
Construction Period:	September 1968 to December 1972	May 1966 to December 1970	November 1969 to December 1975
Operation Date:	December 1972	December 1970	December 1975
Transmission lines and corridors:	Two 345 kV lines transmit electricity over 7.2 miles of new right-of-way corridors before connecting with pre-existing lines. Eleven angle points prevent tunnel effect.	Two 345 kV lines transmit electricity over 9 miles of new right-of-way before connecting with approximately 26 miles of pre-existing lines. Corridors range from 415 ft. to 500 ft. in width. H-frame supporting structures are 80 ft. tall.	One additional 345 kv line. No new right-of-way.
Distance from center of town:	3.5 miles	1.4 miles	Same as Millstone I
Land use:	The site occupies 517 acres, about one-tenth of which have been modified for the nuclear power station. The 395-foot High Pine Hills form a forested backdrop for the 180-foot high station structure. Trees and brush form a sight barrier between the plant and motorists on Rocky Hill Road about one-half mile away.	The site occupies 500 acres; the station is the largest manmade installation in the immediate area with the turbine buildings approximately 105 ft. above mean sea level, and the reactor buildings approximately 160 ft. above. The particular location of the station, the flat terrain and the surrounding water areas along with low vegetation make it difficult to blend the buildings visually with the environs. The 375-foot high ventilation stack is particularly noticeable.	Same as Millstone I

Source: Final Environmental Statement, Pilgrim Nuclear Power Station, United States Atomic Energy Commission, May 1972: Final Environmental Statement, Millstone Nuclear Power Station Unit 3, U.S. Atomic Energy Commission, February 1974.

1. Primary Data Collection

Approximately 30 local and regional decision makers were interviewed for each community. These included members of the boards of selectmen, superintendent of schools, tax assessors, town planners, police and fire chiefs, building inspectors, newspaper editors, as well as regional planners and state officials. The open-ended interviews focused on the perceived impacts of the nuclear plants on the host communities and assessments of community satisfaction and community cohesion.

Additionally, a number of active community volunteers, such as members of voluntary civic and political associations and local interest groups were contacted and interviewed.

2. Secondary Data Collection

Secondary data were collected for the period 1960-1975. Local, regional, state, and national sources were utilized for three time periods: preconstruction, construction, and operation.

The most useful data came from local annual reports of town departments, particularly those of the tax collectors, boards of education, building inspectors, police departments, and planning and zoning commissions. Newspaper accounts and town meeting records for the period 1965-1975 were also valuable sources for identifying significant community events and determining the important actors in any specific period. Other local sources were special reports such as the "Suburban Boston South Area Profile," sponsored by United Community Services of Metropolitan Boston, and the commissioned reports on transportation, environment, and housing conducted by the Department of Urban Planning, University of Rhode Island, for the town of Waterford.

State and national data were gathered to provide a broader comparative perspective of the two towns and their surrounding areas. The most valuable information came from state departmental annual reports, such as those of the Departments of Education and Taxation, which provided detailed data often unavailable at the local level. Information from the U.S. Census of Population, 1960 and 1970 and the U.S. Census of Social and Economic Characteristics of the Population, 1960 and 1970, were useful for the period up to 1970. More recent data were often difficult to obtain. One exception was the U.S. Department of Commerce 1973 population estimates for Massachusetts and Connecticut which were used to update the community profiles.

It should be noted that, in general, secondary data collection at the local and regional level was difficult because of data format and availability problems. Most often, data were available in a format or level of detail unsuited to research aims. Much needed information was simply unavailable; some had never been recorded, some was "missing" for a variety of unstated reasons, and much useful community information formerly collected by the state governments was no longer available in printed form for general public disclosure because of cuts in state printing budgets. One further hindrance was the unavailability of detailed time series data on basic socioeconomic or political characteristics of the host communities prior to 1970 or for most intercensal years.

3. Interviews with Community Residents

An attitude survey was conducted in each town. We met with local officials to inform them of the purposes of the survey and to seek their support. The news media in each town were kept fully apprised of the purpose and the progress of each survey. Survey results are presented throughout the report. Subjects covered by the surveys included:

- respondents' perceptions of the community as a place to live;
- perceptions of future growth and development needs within the community;
- perceptions of the nuclear plant's effect(s) on the respondents' lives and community;
- perceptions of closeness to various groups in the community; and
- background characteristics of the persons interviewed.

The purpose of the random sample of citizen views was to compare their views with those of the elected leaders and active citizen participants whom we had interviewed personally. In Plymouth, 126 individuals were interviewed, and in Waterford, 182 individuals were interviewed.

2. INPUTS: TECHNOLOGY-RELATED FACTORS INTRODUCED TO THE COMMUNITY

2.1 Introduction

This chapter details the inputs which were examined for Plymouth and Waterford. Human resources and generated revenues were stressed, while facility characteristics and the licensing and regulatory process were de-emphasized. The decisions were made on the basis of preliminary site visits, which indicated the relative importance of the inputs for the two communities. While no formal analysis will be undertaken for either facility characteristics or the licensing and regulatory process, some description will be provided, where appropriate, in order to establish the context for the more formal analysis of outputs or impacts.

2.2. Human Resources

The number of and demographic characteristics of the inmigrating (facility-related) labor force can have a significant impact upon the host community. For both Plymouth and Waterford, information was gathered on the construction labor force to ascertain the magnitude of this "input."

Boston Edison officials provided general manpower information for the Pilgrim I power plant. They estimated that on the average, approximately 500 workers constructed Pilgrim I with a peak work force of 700-800 workers. This is a great deal smaller than those facilities currently under construction, which typically require 1800-2000 workers to construct a one-unit facility. Most workers came from union halls in the Boston and Brockton labor shed areas, while some commuted from the Providence, Rhode Island labor area. Since the host community borders two Standard Metropolitan Statistical Areas (SMSAs), an appropriate and sufficient labor supply was available from within the area. Hence, few workers relocated to the site. Table 4 indicates the average number of workers hired during non-peak periods for Pilgrim Unit No. 1 by trade or craft.

Boston Edison estimated that approximately 95 permanent workers operate the reactor on a year-round basis. Some workers live in Plymouth, but most live in surrounding communities and commute daily to the site.

Table 4

Average Number of Workers Hired by Trade or Craft to Construct Pilgrim Unit No. 1 (1968-1972)

Trade or Craft	Average Number Hired for Unit I
Boilermakers	23
Carpenters	49
Masons	18
Electricians	94
Iron Workers	38
Laborers	73
Millwrights	17
Pipefitters	139
Operating Engineers	18
Teamsters	8
Painters	7
Total	484

Source: Boston Edison Utility Company, 1975.

As shown in Table 5, approximately 780 workers were hired at peak construction (in the second quarter of 1968) for Millstone I, and approximately 1,020 workers were hired at peak construction for Millstone II. Like Pilgrim I, most of the labor force was hired through area labor halls, primarily in neighboring New London and Norwich and at peak periods (in the third quarter of 1972) from Hartford and New Haven, Connecticut, and Providence, Rhode Island. Presently, approximately 165 permanent workers operate both Millstone Units I and II. According to officials at Northeast Utilities, the total permanent operating staff will be approximately 250 persons when Unit No. 3 is completed in 1979.

Some useful information regarding the background characteristics of the labor force, including family size, residential location, age distribution, etc., would have been extremely useful to have. However, the data were unavailable from either utilities or unions. This information requirement would have been crucial in a situation where a large part of

Table 5

Millstone I and II Construction Work Force and Wages

Total work force at peak construction:	
Millstone I	780 (Second quarter of 1968)
Millstone II	1,020 (Third quarter of 1972)
Total wages for manual man-hours:	
Millstone I	N.A.
Millstone II	$96.5 million

Source: Northeast Utilities: Hartford, Connecticut, 1975.

the labor force had relocated to the site area. However, as most of the labor force commuted to the sites, the lack of demographic information is mentioned here primarily as a example of the data problems inherent in post facto studies.

2.3 Generated Revenues

Generated revenues refer to the range of revenues resulting from the construction and operation of a facility. Because of the lack of a large inmigrating labor force, and the apparent low level of local purchasing at either site, it was decided to forego assessments of local sales taxes, income taxes, etc., and concentrate instead upon property tax revenues as inputs.

The property tax revenues generated from the facilities over the life of the reactor appeared to have been one of the most important inputs in both communities. Two characteristics of power reactors lead to significant impacts on local taxation: (1) massive capital investment in the physical plant and surrounding utility-owned land and (2) locational criteria which give priority to low population density and water availability as well as electricity demand. Unlike many industries that locate according to market potential or labor supplies, nuclear reactors avoid interacting with other activities, providing the conditions for an almost certain increase in the tax base of a community if the utility is privately-owned. If the plant does not require additional public services in significant amounts, does not hire appreciable numbers of workers during operation, and does not purchase important quantities of local goods and services, the major impact during operation will likely be its effect on the tax base.

For this report, the economic analysis of the local governments assumes that the local public economy identifies selected elements in the private sector as its tax base (value, income, etc.), levies a rate of taxation on this basis, and provides public services with the proceeds of this levy. The relative size of the tax base generated is termed the community's taxable capacity:[6] the act of taxation means fewer dollars will be available to purchase the products of the private sector of the local economy.

In both Massachusetts and Connecticut, the land, plant, and equipment of electrical generation stations are subject to local property taxes. Additionally, inventories and subcontractors' equipment are taxed in varying amounts. The value of these items may be reduced through an exemption on equipment used to mitigate air pollution or environmental damage. Finally, the value is further modified through the application of an assessment ratio, with the final amount equal to assessed valuation for tax purposes.

In both Plymouth and Waterford, the net worth method is used to arrive at a market value figure for the power reactor (i.e., requiring the development of a reconstruction schedule that reflects the effects of physical and technical obsolescence), and in each case the replacement value is derived by reducing the utility's book value by indirect costs that are nonassessable.[7] Plymouth allows the Boston Edison Company (which owns the Pilgrim Station) to make this calculation for the town, while Waterford has retained an appraisal expert to prepare an annual report detailing the Millstone assessment. To calculate the depreciation schedule for Millstone, the town of Waterford has agreed to a stabilized rate of 30% depreciation over a 16-year period. This provides the town with a more or less constant tax base over time, in contrast to the declining value that could occur under alternative schedules. At present, there appears to be no depreciation schedule for the Pilgrim Station.

However, Boston Edison reports approximately one-third of its capital investment as environmental protection equipment, while in Waterford this exemption does not figure heavily in the calculation of value. Finally, each town applies the full legal assessment ratio to its power station, a rate that is likely higher than that of most other parcels in town. For Plymouth this rate is 50% and in Waterford about 60%.

Thus, although the tax system sets the bounds for calculation of each facility's assessment, the final figure is in large part a negotiated value, with neither side pressing hard to gain advantage. Typically, the utility company does not want to exert undue pressure upon the community to grant tax concessions because it does not wish objections either to its presence, or to the construction of additional generating units. The towns, on the other hand, do not wish to call unnecessary public attention to their unique tax situations by engaging in court battles that might increase assessments, particularly since both state legislatures have pending before them legislation that would redistribute tax payments from reactors on a state-wide basis. Moreover, from the point of view of Plymouth and Waterford, the addition of the stations to the tax base was a notable gain; hence, they do not lodge extraneous protests.

The magnitude of the influence of the Millstone and Pilgrim Stations upon the tax structure can clearly be seen in Tables 6 and 7, which present the level of assessed values for each town prior to construction of the power plants, the taxable value recorded for each station, the proportion which the station comprises of total taxable values, and the value associated with non-plant property. However, direct comparisons of value between towns should be avoided since all values are shown in terms of actual assessments. To the degree that the average assessment ratios for the two towns differ, the value levels are not comparable.

For each town, the influence of the stations on taxable capacity began in about 1968 and in dollar terms remained about the same through 1973. At this point, a second generating unit at Waterford further increased the tax base. A similar impact will occur in Plymouth when and if the second Pilgrim unit arrives on the tax roll.

Perhaps the most important measure of the taxable capacity impacts is the percent of the total town property tax base which each plant comprises, shown in Tables 6 and 7. In each case, this proportion is so large that the traditional tax burden has been significantly altered with the town possessing the option for either a major decrease in tax rates or major increases in service levels. At roughly 0.50, as in Plymouth and Waterford, this proportion indicates that service levels could be doubled at a constant tax rate or maintained at one-half the present tax rate. For individual households, the circumstance could mean an impact much greater than the Federal income tax rebate of 1975, and, for business, it could mean a potentially significant percentage increase on return per dollar of invested capital. Stated differently, the effective impact of the power stations is to match local property tax payments by the ratios shown in Tables 6 and 7. For example, in Waterford the facility pays $0.59 out of each local property tax dollar, or $1.42 for each dollar that is raised by other local taxpayers. In Plymouth, the input is slightly less. Here the facility pays about $0.46 on the tax dollar, or $0.85 for each local dollar raised.

Plymouth has recently increased in population more rapidly than has Waterford; this growth is reflected in its increase in "non-plant" assessments. Between 1969 and 1974, Plymouth population increased by roughly 50%, a rate many times larger than that of Waterford. For this reason, the per capita impact of Pilgrim on taxable capacity has been diluted somewhat. Over the period shown, total assessed values per capita tripled in Waterford and more than doubled in Plymouth, but non-plant assessments increased only about 25% per capita in each town.

Workers' purchases of local goods and services represent another economic input, but one which was not significant in these two cases.

2.4 Facility Characteristics

Facility characteristics appeared to be of minor consequence in both communities. No major facility-related conflicts over land use at the sites nor over ancillary facilities seem to have arisen in either community. Impacts upon surrounding areas, including access roads, city and land-use changes as reflected in zoning changes, were examined, but were left for future analysis.

Table 6

Impact of Millstone Units on Assessed Values*

Waterford, Connecticut

Year	Total Assessed Value	Plant Value	Plant Proportion of Total Value	Non-Plant Value
1966	$ 66,053			$66,053
1967	66,462			66,462
1968	72,744	$ 5,643	0.08	67,101
1969	90,344	20,867	0.21	69,467
1970	97,983	25,846	0.26	72,137
1971	112,385	39,369	0.33	75,216
1972	130,564	51,351	0.39	79,213
1973	168,456	81,728	0.49	86,728
1974	221,189	129,756	0.59	91,443

*in thousand of dollars.

Source: Annual Reports: Town of Waterford.

Table 7

Impact of Pilgrim Unit on Assessed Values*

Plymouth, Massachusetts

Year	Total Assessed Value	Plant Value	Plant Proportion of Total Value	Non-Plant Value
1966	$ 43,451			$43,451
1967	45,827			45,827
1968	47,629	$ 132		47,497
1969	51,515	1,456	0.03	50,059
1970	68,751	14,510	0.21	54,241
1971	93,728	29,808	0.32	63,290
1972	114,559	44,808	0.39	69,751
1973	154,429	76,442	0.49	77,987
1974	165,212	76,442	0.46	88,770

*in thousands of dollars.

Source: Annual Reports: Town of Plymouth.
Additional unpublished data provided by the town assessor's office.

2.5 Licensing and Regulatory Procedures

While substantial recent debate has surrounded the licensing and regulatory process for reactor siting in general, focusing on the extensive time period needed for licensing approval and reflecting intervenors' frustrations with the licensing procedure, we spent little time exploring this input category. We did, however, examine the routine licensing and regulatory history for each site for irregularities or unusual events.

Licensing hearings for Millstone I and II and Pilgrim I were similar in content and emphasis to hearings for other nuclear plants licensed in the same era. Licenses were obtained from Federal, state, and local jurisdictions, and hearings proceeded on schedule with few delays.[8] In hearings for Millstone I and II, intervention from local citizens centered on ecological grounds such as thermal pollution of Long Island Sound. Intervenors from the Hartford area were part of a national effort to halt the construction of nuclear plants rather than a local, indigenous effort. Intervention in Pilgrim I licensing evolved around several local individuals whose primary concerns were radiation effects and the ecological balance of Cape Cod Bay.[9] These contentions were voiced in both public hearings and the local press; however, the community of Plymouth made little response to calls for halting construction. Since that time, a few individuals have formed the Plymouth County Nuclear Information Center (PCNIC), with the stated objective of informing the local community about the hazards of nuclear power.

Since Pilgrim I began operation in December 1972, after four years of construction, Boston Edison and the Nuclear Regulatory Commission have monitored the operation of the facility on a regular basis. According to local newspaper accounts, three non-routine incidents have occurred at the site which have prompted Federal investigation:[10] first, the killing of approximately 5,000 menhaden fish in the thermal plume in April 1973; second, a seven-month shutdown from December 1973 to August 1974, due to damaged channel boxes which carry the cooling water through the reactor core; and third, a "scram" in September 1975 when the generator supplying power to the plant failed, causing an abrupt and automatic shutdown of the reactor. Various other routine scheduled shutdowns have occurred for general maintenance and fuel reloading.

Millstone I, which began operation in December 1970, after a four and one-half year construction period, and Millstone II, which went on-line in December 1975, have experienced few incidents resulting in Federal investigation, though there have been several minor abnormal occurrences in their operating histories. In September 1972, higher-than-normal discharges of liquid radioactive materials into Long Island Sound occurred as a result of seawater intrusion into Millstone I.[11] This water (2,000,000 gallons) contained a significant amount of radioactive isotopes and resulted in an increase in the "Annual Average Discharge" which exceeded Federal standards, according to the New London Day. In April 1975, Millstone personnel improperly allowed 2,500 gallons of radioactive water to escape from the plant instead of entering a waste treatment system. This event resulted in evacuation of employees for a short period. A second release of 1,000 gallons into Long Island Sound occurred three days later. NRC officials cited the releases as "infractions" and stated that the incidents resulted from "inadequate management."[12]

These four inputs — human resources, generated revenue, facility characteristics, and licensing and regulatory procedures — interact with the local community structure resulting in a number of outputs or "impacts" upon that structure. Recoginzing that a number of definitions of "community" exist within the literature, for our purposes we are broadly defining "community" as a single geo-political unit inclusive of: (a) a social system, (b) an economic system, (c) a political system, and (d) a public services system.[13] We have organized Chapter 3, Community Profiles, in terms of such a structure.

The feedback "loop" in the model was established to show that impacts may act as another input into the community, creating what might be called secondary effects. The magnitude and direction of the impacts in general can be determined by the relative importance, duration, frequency and intensity of occurrence of the interaction between the four inputs and the community. These impacts, comprising the research findings of this report, are discussed in Chapter 4.

3. COMMUNITY STRUCTURE: A PROFILE OF PLYMOUTH AND WATERFORD

3.1 Introduction

This section describes the context of the nuclear power plants' host communities. As the community structures are constantly evolving, any cross-sectional description is necessarily less than optimal. In the situations of Plymouth and Waterford, data availability and time constraints severely limited contextual descriptions. It should be noted, then, that the narrow characterization of the community structure is not a full reflection of our conceptual framework. It is, in part, an indication of problems of measurement. Thus, for example, characteristics of political structure, such as background information on opinion leaders, or interest group influences could not be examined, although they would have been extremely useful in understanding the communities and explaining the direction or magnitude of impacts. As an indicator of the face validity of the social impact assessment model, as described in the previous sections, it will be seen that, in the following descriptions, the distinctions between impacts and system state indicators will, in many cases, be blurred. Referring to Figure 1, this phenomenon can be seen as descriptive of the "feedback" portion of the model, whereby impacts have an effect upon the ongoing dynamics of the community. More detailed analyses and validation procedures must await future studies.

3.2 Plymouth, Massachusetts

3.2.1 Social and demographic characteristics

The town of Plymouth, Massachusetts is located on the coastal shores of southeastern Massachusetts, approximately 35 miles south of Boston and 40 miles northeast of Providence, Rhode Island. Surrounded by Kingston to the north, Middleboro and Carver to the west, Bourne and Cape Cod to the south, and Cape Cod Bay to the east, the 104-square mile community (the largest area of any Massachusetts town) is the county seat for the 27-community Plymouth County area, as shown in Fig. 2, and is part of the Southeastern Regional Planning and Economic Development District (SRPEDD), a recently defined state planning area.[14,15]

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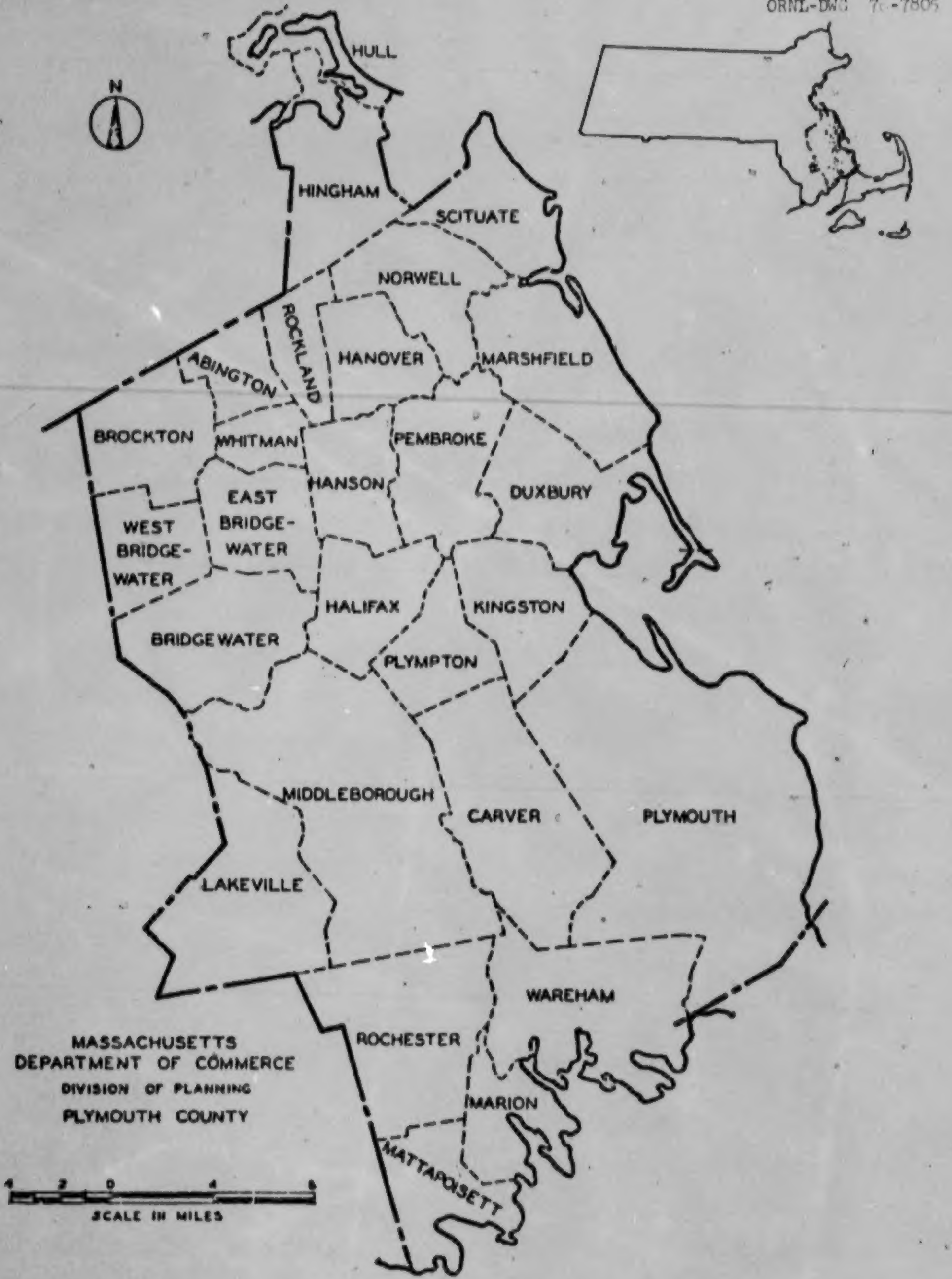
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EAST BRIDGE-WATER
WEST BRIDGE-WATER
HALIFAX
KINGSTON
BRIDGEWATER
PLYMPTON
MIDDLEBOROUGH
CARVER
PLYMOUTH
LAKEVILLE
WAREHAM
ROCHESTER
MARION
MATTAPOISETT
MASSACHUSETTS
DEPARTMENT OF COMMERCE
DIVISION OF PLANNING
PLYMOUTH COUNTY
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SCALE IN MILES

Fig. 2. Map of Plymouth County, Massachusetts.

Like most communities in the Plymouth County area, Plymouth experienced steady growth during the 1950s and the early portion of the 1960s (Table 8). The population increased from 13,568 in 1950 to 14,445 in 1960 and to 15,400 in 1965.[16] It was not until after 1965, however, that Plymouth began experiencing more rapid growth from the 1965 figure of 15,400 to 18,606 in 1970 (a 21% change) to approximately 28,000 in 1975 (a 51% change from 1970). The growth rate during this period was approximately 8% per year.

Rapid growth may impact many areas of community life. We focused on two areas that reflect more general changes (housing and schools), using available data on building permits[17] and school enrollment (to be discussed under public services). The number of residential building permits rose sharply in 1971 with 476 permits issued during that year, twice as many as the previous year (Table 9). In 1972, 873 permits were issued, almost doubling again, the largest number ever issued in one year in Plymouth. The number decreased to 635 in 1973 and again to 216 in 1974 — a drop which may be attributed to national housing and economic trends as well as the passage of a strict local zoning ordinance.[18,19] When asked about their attitudes toward this extensive development, respondents were equally divided among supporters and opponents of development.[20] Reasons given for favoring growth included: (1) it is basically healthy, although it should proceed with proper planning (33.3%); (2) it improves the tax situation (17.4%); and (3) it increases job opportunities (15.9%). The primary reason for opposing growth was the belief that too much growth was occurring at the time within the community (49.2%).

In 1970, the most recent year for which statistics were available, the median age of Plymouth residents was 33.5 (as shown in Table 10), as compared to 27.4 years for county residents. The median number of school years completed by Plymouth residents (as shown in Table 11) was 12.1 as compared to 12.4 for the county. Table 12 shows that the median income for Plymouth residents was $9,510 per year as compared to $10,998 per year for county residents. The distribution of age and income characteristics for Plymouth are not (statistically) significantly different from those of the county or state (Mann-Whitney U Test).

Table 8

Population for Plymouth, Plymouth County, and Massachusetts for 1950-1973

Area	1950	1960	Δ1950-1960	1965	1970	Δ1960-1970	1973 (Estimate)	Δ1960-1970
Plymouth Town	13,568	14,445	6.2%	15,400	18,606	28.8%	23,548	26.8%
Plymouth County	189,468	248,449	31.1%	NA	333,314	34.2%	364,700	9.4%
Massachusetts	4,690,514	5,148,578	9.8%	NA	5,689,170	10.5%	5,818,000	2.3%

Source: U.S. Census of Population, Massachusetts, 1960 and 1970; also, Estimates of the Population of Massachusetts Counties and Metropolitan Areas: July 1, 1972 and 1973.

Table 9

Building Permits Issued — Plymouth, Massachusetts

Year	Total[1] permits	Commercial permits	Residential permits (year round)	Residential permits (seasonal)
1960	219	7	56	NA
1961	188	8	69	NA
1962	146	9	118	NA
1963	157	7	88	NA
1964	170	9	90	91
1965	250	3	88	97
1966	233	8	85	67
1967	190	11	73	69
1968	276	10	145	33
1969	293	16	168	38
1970	348	12	237	34
1971	604	16	476	35
1972	1004	16	873	27
1973*	757	6	635	26
1974	306	18	216	2

[1] Total permits = Commercial permits + year round residential permits + summer dwellings + various other building code permits.

Does not include 110 apartments for the elderly, 40 apartments for veterans, or 100 more elderly units presently under construction (1975 by the housing authority.

*1973, addition of a strict zoning ordinance.

Table 10

Age Composition for Plymouth, Plymouth County, and Massachusetts, 1970

Age	Percent of Total Plymouth	Plymouth County	Massachusetts
Under 5 years	9.0	10.0	8.3
5-14 years	17.0	22.1	19.3
15-19 years	7.0	8.3	9.0
20-64 years	52.0	49.9	52.2
65 and over	15.2	9.6	11.2
Under 18	30.8	37.7	33.0
21 and over	66.0	58.2	61.7
Median age	33.5	27.4	29.5

Source: U.S. Census of Population, Massachusetts and County and City Data Guide, 1972.

Table 11

Educational Attainment for Plymouth, Plymouth County, and Massachusetts, 1970

Education
(25 years and over)

Educational Attainment	Percent of Total Plymouth	Plymouth County	Massachusetts
Completing less than 5 years	2.0	2.6	4.1
Completing high school	55.0	63.0	58.5
Completing college			
Males	11.0	11.4	12.6
Females	8.0	11.4	12.6
Median school years completed	12.1	12.4	12.2

Source: U.S. Census of Population, Massachusetts and County and City Data Guide, 1972.

Table 12

Income Distribution for Plymouth, Plymouth County, and Massachusetts, 1970

Income Distribution	Plymouth	Plymouth County	Massachusetts
Income under $3,000	8.0%	5.6%	6.4%
From $3,000-$4,999	9.0%	6.4%	7.2%
From $5,000-$6,999	13.0%	8.8%	9.7%
$10,000-$14,999	28.0%	33.4%	30.9%
$15,000 and over	18.4%	24.6%	25.2%
Median Income	$9,510	$10,998	$10,833
Per capita income	$3,337	$3,216	$3,408

Source: U.S. Census of Population, Massachusetts, 1970 and County and City Data Guide, 1972.

3.2.2 Economic characteristics

Table 13 reports the number of industries in the town of Plymouth during the period from 1965 to 1974. While there was an overall increase in all types of industries over the 10-year span, service industries experienced the greatest growth.

Figures from the 1960 and 1970 Census show an increase in persons listed as professionals in Plymouth from 16% to 24%.[21] Persons employed in occupations which could be categorized as highly skilled decreased from 39% to 21% and the number of persons whose occupations could be categorized as semi-skilled increased from 45% to 55%.

A major concern of local officials was the high unemployment rate despite community growth. High unemployment is characteristic not only of Plymouth but the entire southeastern Massachusetts region.[22] Until recently, a small cranberry industry, tourism, and summer residents supplied a major portion of Plymouth's income and employment. Despite some new light industry moving into a newly-created Industrial Park, unemployment still persists in the Plymouth labor area and has been the highest or second highest in the state since 1969. As shown in Table 14, unemployment for the area did not fall below 13.9% from 1965 to 1975. Plymouth's geographical location outside the Boston and Brockton SMSA, its historical reliance on tourism and other seasonal industries, and its lack of major commercial or industrial development may account for much of this high unemployment rate. The relative contribution of new residents to employment totals was not analyzed in this study, although it is known that many new residents commute to jobs outside Plymouth in the Boston and Brockton areas.

3.2.3 Political characteristics

Since its founding in 1620, Plymouth has been governed by a representative town meeting with representatives elected from seven precincts within the community. The 105 town meeting members elected for a two-year term of office, vote on issues of local and regional importance. In addition, several elected selectmen have general responsibilities to oversee town affairs and define standard operating procedures for the

41

Table 13

Industries Located in the Town of Plymouth, 1965-1974

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Agriculture	9	9	10	9	10	10	10	11	13	13
Construction	69	71	69	65	63	68	71	77	84	83
Manufacturing	18	18	17	22	19	19	19	22	27	30
Transportation/Utility	19	22	18	23	22	20	20	20	21	23
Wholesale/Retail	183	179	185	180	177	195	172	178	189	189
Finance/Real Estate/Insurance	17	17	17	19	20	22	23	23	25	29
Service Industries	109	102	116	442	442	450	447	467	504	510

Source: Massachusetts Department of Employment Security.

Table 14

Unemployment Rates: Plymouth Labor Area* and State of Massachusetts, 1965-1974

	Total Work Force		Total Unemployment		Unemployment Rate	
Year**	Plymouth Labor Area	State	Plymouth Labor Area	State	Plymouth Labor Area	State
1965	7,230	NA	1,200	NA	16.1	NA
1966	6,280	NA	1,100	NA	16.1	NA
1967	7,130	2,395,000	1,100	108,000	18.0	4.0
1968	7,050	2,443,000	1,170	109,000	16.7	3.8
1969	7,120	2,447,000	1,000	111,000	14.0	4.1
1970	7,720	2,455,000	1,070	114,000	13.9	4.6
1971	9,660	2,462,000	1,670	163,000	17.3	6.6
1972	9,210	2,489,000	1,770	160,000	19.2	6.4
1973	10,810	2,565,000	2,300	171,000	21.3	6.7
1974	12,750	2,623,000	1,970	183,600	15.5	7.7

*Includes Plymouth, Kingston, Plympton, and Carver (Carver included as of January, 1968).

**Based on January totals.

Source: Massachusetts Department of Employment Security.

community. When faced with new and unfamiliar issues and an increased work load for these town officials,[23] the community hired a full-time executive secretary in 1974 and a full-time public works director in 1975. Concern about the rapid growth rate resulted in the hiring of a professional city planner in 1973, with thought being given to hiring a second planner. Debate also continued about the need to hire a full-time rather than part-time town counsel to handle the increasingly complex legal issues which the town now faces.

3.2.4 Public service characteristics

With extensive growth occurring, the public school system in the community has been severely strained. School enrollment increased 120% from 3,011 students in 1965 to 6,630 students in 1975, necessitating double sessions for some elementary pupils from 1971 until 1974, when three new schools were completed.[24] Much of this growth occurred in the period 1971-1974, as illustrated in Tables 15 and 16. In 1971, the enrollment increased by 410 pupils, in 1972 by 456 pupils, in 1973 by 1,271 pupils, and in 1974 by 748 pupils. The 1973 and 1974 increases were swelled by addition of a kindergarten program as mandated by the state. The Plymouth-Carver Regional School Board is presently considering the construction of a second regional high school to accommodate this increase in enrollments.

A full-time public works director now directs the combined building maintenance, engineering, forestry, highways, sanitation, sewer and water departments. This approach has recently permitted the town to deal more effectively with two of its major physical problems: the layout and maintenance of sewer and street facilities in new areas of the community.

3.3 Waterford, Connecticut

3.3.1 Social and demographic characteristics

The Millstone Nuclear Generating Station Units I and II are located in the town of Waterford, Connecticut, on the north shore of Long Island

Table 15

School Enrollment 1965-1975
Plymouth, Massachusetts

	Grade														
Year	K*	1	2	3	4	5	6	7	8	9	10	11	12	Other**	Total
1960		261	221	243	209	192	252	261	756	249	179	161	157	79	2720
1961		293	242	223	235	206	194	256	263	254	224	155	138	75	2758
1962		279	268	239	216	229	204	196	253	269	247	207	139	76	2822
1963***		291	257	262	239	216	225	197	195	280	297	272	211	79	3021
1964		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3011
1965		282	282	252	230	272	249	201	230	240	220	282	281	94	3115
1966		293	254	270	239	241	256	245	202	236	204	197	239	72	2948
1967		314	266	265	263	240	248	263	247	216	237	193	185	123	3060
1968		328	290	293	267	271	267	264	272	313	258	282	225	56	3386
1969		356	322	330	317	285	298	281	275	335	308	267	269	100	3743
1970		321	335	332	330	307	291	307	284	343	342	292	261	98	3843
1971		397	354	359	363	359	343	323	319	378	355	335	278	90	4253
1972		446	414	390	388	388	459	449	416	347	343	301	281	87	4709
1973****	455	511	481	463	448	436	520	506	493	458	426	346	331	106	5980
1974	539	536	557	525	503	506	594	569	546	537	480	388	382	66	6728
1975	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6630

Source: Plymouth annual reports.

* - Kindergarten program added by State requirement in 1973.
** - Other = students enrolled in special education classes and post graduate classes.
*** - Plymouth and Carver join secondary schools.
**** - Intermediate Schools become regional school (grades 6-8).

Table 16

Plymouth School System Percentage Change of Total Enrollment

1960-1961:	1.3%	1960-1965: 11%	1960-1974: 147.4%
1961-1962:	2.2%		
*1962-1963:	6.5%		
1963-1964:	NA**		
1964-1965:	3.0%		
1965-1966:	-5.4%	1966-1970: 30%	
1966-1967:	4.0%		
1967-1968:	11.0%		
1968-1969:	10.5%		
1969-1970:	2.6%		
1970-1971:	10.7%	1971-1974: 52%	
1971-1972:	10.7%		
1972-1973:	27.0%		
1973-1974:	12.5%		

* Plymouth and Carver combine Secondary Schools.
** Growth rate not applicable to the newly formed school district.

Source: Plymouth, Massachusetts, Department of Education

Sound and on the east shore of Niantic Bay (Fig. 3). Bounded by the city of New London to the east and the suburban towns of Montville to the north and East Lyme to the west, Waterford is situated in the southeastern Connecticut region, 40 miles equidistant from Hartford and New Haven. The 18 municipalities forming this region are variously known as the New London-Groton-Norwich SMSA, New London County, and the Southeastern Connecticut Regional Planning Area (SCRPA). Included in the region are three urban communities, ten suburban towns, and five rural villages.[25]

Demographically, Waterford is quite different from its immediate neighbors. In 1970 Waterford had a population of 17,227 on 40 square miles. The neighboring city of New London had a population of 31,630 on 3.6 square miles, a dramatic difference in density.[26] The 1970 Waterford population figure showed an increase of 12%, the second smallest increase in the region since 1960. This was a considerably smaller increase than the 24% increase experienced by the county and the 20% by the state. Moreover, it represented a much smaller increase than the 1950-1960 figures when Waterford grew from 9,100 to 15,391, an increase of 69% (as shown in Table 17). More recent population estimates indicate a 1974 population of 17,867 and a 1975 population of approximately 18,300 persons.

Though Waterford is immediately adjacent to a heavily industrialized area, it continues to maintain a suburban, residential character. Three-acre lots for single family residences zoned rural residential, are designated in some parts of the town, while one-half acre lots are the minimum in other portions.[27] Residential growth in Waterford increased in the last decade, with building permits reaching a high of 147 in 1972-73 (Table 18). While 36% of the region's housing stock is multiple-dwelling units, Waterford's housing has been almost exclusively single-family residential development. Only recently have multiple-family dwellings been allowed by zoning regulations.[28]

Table 19 shows that the median age of Waterford residents in 1970 was 31.3 years as compared to 26.4 years for the county, making it the second oldest community in the county. In 1970 the median number of

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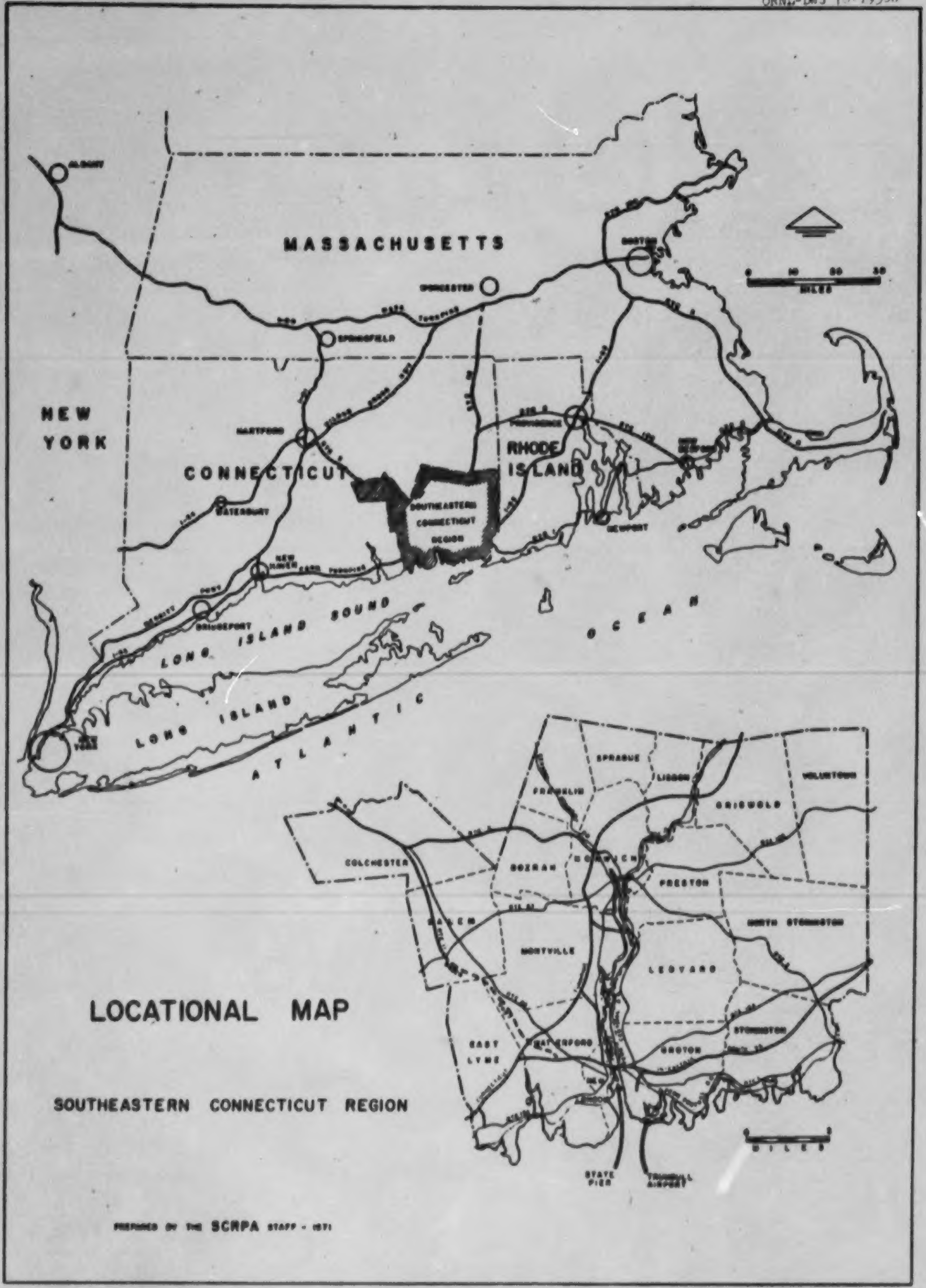
MASSACHUSETTS
ALBANY
BOSTON
WORCESTER
SPRINGFIELD
NEW YORK
HARTFORD
CONNECTICUT
WATERBURY
NEW HAVEN
BRIDGEPORT
RHODE ISLAND
PROVIDENCE
NEWPORT
NEW BEDFORD
SOUTHEASTERN CONNECTICUT REGION
LONG ISLAND SOUND
LONG ISLAND
ATLANTIC OCEAN
NEW YORK
MILES
LOCATIONAL MAP
SOUTHEASTERN CONNECTICUT REGION
SPRAGUE
LISBON
FRANKLIN
VOLUNTOWN
GRISWOLD
COLCHESTER
BOZRAH
NORWICH
PRESTON
SALEM
MONTVILLE
NORTH STONINGTON
LEDYARD
EAST LYME
WATERFORD
GROTON
STONINGTON
STATE PIER
TRUMBULL AIRPORT
MILES
PREPARED BY THE SCRPA STAFF - 1971

Fig. 3. Southeastern Connecticut Region.

Table 17

Population for Waterford, New London County, and Connecticut for 1950-1973

Area	1950	1960	Δ1950-1960	1965	1970	Δ1960-1970	1973 (Estimate)	Δ1970-1973
Waterford	9,100	15,391	69%	16,600	17,227	12%	17,861	3.7%
New London County	144,821	185,745	28.2%	NA	230,348	24%	237,717	3.1%
Connecticut	2,007,280	2,535,234	26.3%	NA	3,031,709	20%	3,079,523	1.6%

Source: U.S. Census of Population, Connecticut, 1960 and 1970; also, Estimates of the Population of Connecticut Counties and Metropolitan Areas, July 1, 1972 and 1973.

Table 18

Commercial and Residential Growth Number of Permits Issued 1960-1974

Year	Waterford, Connecticut Commercial	Residential
1960-1961	61	80
1961-1962	22	103
1962-1963	17	92
1963-1964	18	64
1964-1965	15	57
1965-1966	NA	NA
1966-1967	12	52
1967-1968	23	64
1968-1969	11	74
1969-1970	16	66
1970-1971	37	98
1971-1972	45	122
1972-1973	35	147
1973-1974	8	103

Source: Town of Waterford, Connecticut, Building Inspectors Annual Reports, 1960-1974.

Table 19

Age Composition for Waterford, New London County, and Connecticut, 1970

Age	Percent of Total Waterford	New London County	Connecticut
Under 5 years	7.0	9.0	8.3
5-14 years	22.0	20.0	20.0
15-19 years	10.0	9.0	9.0
20-64 years	53.0	53.0	62.0
65 and over	9.0	9.0	9.6
Under 18 years	35.0	35.0	34.0
21 and over	61.0	60.0	62.0
Median	31.3	26.4	29.5

Source: U.S. Census of Population, Connecticut, 1970 and County and City Data Guide, 1972.

school years completed by Waterford residents was 12.2 years as compared to 12.1 for county residents. Approximately 59% of Waterford residents completed high school and approximately 10% had from one to three years of college (Table 20). Finally, Waterford's median income in 1970 was $11,645 as compared to $10,518 for the region (see Table 21), making it the third wealthiest community in the region.

Table 20

Educational Attainment for Waterford, New London County, and Connecticut, 1970

Education (25 years and over)

Educational Attainment	Percent of Total: Waterford	Percent of Total: New London County	Percent of Total: Connecticut
Completing less than 5 years			
Males	1.0	3.8	4.3
Females	2.0	3.8	4.3
Completing high school or more	59.2	54.4	56.0
Completing college			
Males	13.0	11.1	13.7
Females	7.0	11.1	13.7
Median school years completed	12.2	12.1	12.2

Source: U.S. Census of Population, Connecticut, 1970 and County and City Data Guide, 1972.

Table 21

Income Distribution for Waterford, New London County, and Connecticut, 1970

Income Distribution	Waterford	New London County	Connecticut
Income under $3,000	1.0%	8.0%	5.4%
From $3,000-$4,999	6.0%	6.6%	5.6%
From $5,000-$6,999	7.0%	9.5%	7.8%
10,000-14,999	35.0%	31.1%	32.0%
$15,000-over	27.6%	22.8%	31.1%
Median income	$11,654	$10,518	$11,808
Per capita income	$3,579	$3,274	$3,885

Source: U.S. Census of Population, Connecticut, 1970 and County and City Data Guide, 1972.

3.3.2 Economic characteristics

Unlike the Plymouth labor area, the New London labor area has a low rate of unemployment, as shown in Table 22. For all but two years from 1965 to 1974, the unemployment rate has been significantly lower than the rate for the State of Connecticut. Figures from both the 1960 and 1970 Census show that approximately 26% of Waterford's residents were listed as professionals. Many of Waterford's residents are employed in the Thames River Industrial Complex, an industrial grouping consisting of the General Dynamics Electric Boat and the U.S. Naval Submarine Base in Groton, the U.S. Coast Guard Academy, the U.S. Naval Underwater Sound Laboratory, and the Pfizer Corporation in New London. The New London County area is dominated by this complex, which employs nearly two-thirds of the work force in the area. Due to the employment needs of those defense-related industries and large manufacturing concerns, the area's unemployment rate continues at the lowest level in the state.

Table 22

Unemployment Rates: New London County Labor Area and State of Connecticut, 1965-1974

Year	Total Work Force New London Labor Area	Total Work Force State	Total Unemployment New London Labor Area	Total Unemployment State	Unemployment Rate New London Labor Area	Unemployment Rate State
1965	57,000	1,185,000	1,500	46,000	2.6	4.1
1966	58,000	1,241,000	1,600	39,500	2.7	3.2
1967	56,200	1,285,600	2,000	43,100	3.6	3.4
1968	56,500	1,318,000	2,200	49,500	3.9	3.8
1969	57,200	1,340,000	2,100	51,700	3.7	3.9
1970	56,000	1,362,000	2,800	78,000	5.0	5.7
1971	57,000	1,379,000	3,600	116,000	6.3	8.4
1972	58,000	1,411,000	4,000	121,000	6.9	8.6
1973	61,000	1,420,000	3,100	89,000	5.0	6.3
1974	61,500	1,422,000	2,700	90,600	5.5	8.1

Source: Connecticut Department of Labor Statistics, 1974.

3.3.3 Political characteristics

Politically, Waterford is similar to Plymouth in that it is governed by three elected selectmen and a Representative Town Meeting (RTM) of 33 members from five voting districts. Each member is elected for a two-year term — one representative for each 300 voters in the district. The RTM, an elected lay body, has eight standing committees which are the primary decision-making bodies within the community.[29] As a result of new service demands being placed on the town government, pressure is being exerted by some citizens to consider alternatives to the RTM. Results of interviews as well as observations at meetings of the RTM indicate that some groups in the community see the need for more professionalism in town government to facilitate increased service delivery. While the calls for reform are increasing, only 6% of our Waterford sample expressed a desire for change in the governmental structure. Nonetheless, Waterford did hire some new staff members during 1974 and 1975, including a professional urban planner and a director of public works.

3.3.4 Public service characteristics

In keeping with its slow, steady rate of development, Waterford's public school system showed little significant change in total pupil enrollment in the past 15 years.[30] Total enrollment showed gradual increases during the 1960s (Table 23), peaking in 1968 at 4,574 students. After some fluctuation in the years 1970-1974, enrollment dropped to 4,159. Waterford officials have recently proposed that a new public high school be built at a cost of $14 to $16 million, half of which may be reimbursable by the state. The capacity of the new school would be 1,600 to 1,800 students and according to the school superintendent, would fill the present priority need for art, industrial art, and other vocational educational facilities.

In summary, Waterford remains a primarily single-family residential community adjoined by a highly industrialized area which employs many of its residents. Waterford continues a moderate level of public services and the strict zoning policy adopted after its sudden growth in the 1950s. This policy is defended by elected town officials who see extensive growth as harmful to Waterford's future, a position they believe is representative of local public opinion. A majority of residents sampled feel a strong sense of community attachment and believe that Waterford is a desirable place for peoples of all ages to live.[31] Those that have moved there recently have done so primarily because of job opportunities in the surrounding industrial complex and the favorable housing situation. A majority of those sampled (71%), believed growth to be beneficial to the town, but stated that this growth should proceed with caution and planning. The major reasons given for favoring growth were that it would secure (and improve) the present stabilized tax situation, and that it would bring additional business and industry to the community. When asked what changes were needed in the community, the respondents suggested an increase in communication between elected officials and town resident (23%), a change in the present political structure (6%), and a need for increased public services, primarily the addition of a sewer system for the entire community (14%).

Table 23

School Enrollment 1960-1974
Waterford, Connecticut

Year	Grade													Total
	K	1	2	3	4	5	6	7	8	9	10	11	12	
1960	347	401	367	348	295	302	289	208	284	258	208	222	194	3625
1961	352	392	383	355	351	305	283	289	299	298	219	209	207	3955
1962	355	391	354	387	343	358	306	288	296	328	258	224	202	4120
1963	354	412	394	359	373	329	335	300	282	327	283	241	212	4231
1964	360	397	382	383	342	379	317	342	300	305	262	276	236	4362
1965	347	379	388	386	356	345	378	309	335	326	268	254	262	4428
1966	330	380	368	369	364	358	329	370	312	360	264	269	238	4433
1967	325	371	378	370	365	362	352	323	375	305	324	272	259	4518
1968	324	356	372	373	361	371	371	359	314	370	279	309	256	4574
1969	338	335	355	380	366	371	367	377	388	333	336	273	305	4524
1970	270	360	328	375	363	370	367	369	365	390	282	337	265	4441
1971	238	301	340	317	376	384	373	365	365	376	329	278	317	4359
1972	216	264	288	347	330	375	386	386	380	372	337	311	259	4251
1973	241	243	270	315	364	341	376	401	385	410	328	351	289	4314
1974	236	257	239	265	305	374	335	362	395	415	353	309	314	4159

Source: Town of Waterford Annual School Reports: 1960-1974.

4. OUTPUTS: COMMUNITY IMPACTS OF POWER PLANT CONSTRUCTION AND OPERATION

4.1 Introduction

This section focuses upon the social, economic, and political impacts which have occurred from the interaction between facility-related inputs and the community structure, or context. These socioeconomic impacts represent the principal research findings of this study. Four general conclusions emerge from the analysis. First, it was found that the most significant direct impact upon both communities was from property tax revenues. Second, some types of impacts — strains on services and housing problems — were averted by the dispersed location of the construction labor force and commuting patterns. Third, it is likely that land use and community development impacts were heavily affected by local planning and zoning activities and policies. There is also some evidence to indicate that the political participation patterns in the community have changed both as concerns intra-community decision making and in the relationship of the community to surrounding jurisdictions.

4.2. Property Tax Revenue Impacts

The major impact of the nuclear power plants upon both communities was the large increase in the property tax base. No other major inputs of money into the local economies occurred since few jobs were created, and relatively few local procurements were made. This section presents an analysis of this phenomenon as observed in each community by examining the magnitude of the tax base changes which occurred and the manner in which each community reacted to the change.

A significant increase in a community's revenue base allows that community to: (1) increase services with a constant tax rate, (2) maintain service levels with a commensurately reduced tax rate, or (3) adopt both a lower tax rate and a higher level of services. In practice, however, the actual transactions entered into are much more difficult to distinguish than these simple options imply.

First, the tax base increase occurs incrementally, so that its full weight is not felt at once. Separating the influence of the power station from other influences over time is therefore difficult. Second, with increasing revenues, various pressures are placed upon budgetary officials that would otherwise not occur. These pressures tend to increase expenditures, but may have only limited influence on service levels. Third, towns such as Plymouth and Waterford are not independent entities and are subject to the influence of their respective state governments and surrounding regional influences. Thus, when the state makes mandatory a kindergarten program, as was recently done in Massachusetts, one must avoid erroneously attributing the spending increase to the influences of the energy facility. Also in the case of Plymouth, a number of events combined to bring about a rapid increase in population, for instance, outmigration from Boston and the completion of a coastal highway, as well as the presence of a favorable public-service to tax-payment ratio. Such growth entails the construction of roads, sewers, and water lines, all of which require large expenditures. Once again, the influence of the plant is difficult to isolate. Finally, in both states, a uniform fiscal year was made mandatory since construction of the nuclear plants. Plymouth made its adjustment in 1973, and, as a consequence, expenditure data since then are inconsistent with earlier periods. Waterford has only recently made this change. It created a special fund to stabilize its cash position during the transition period which artificially inflated its tax rate over the past few years.

For these reasons, as well as the general difficulty in quantifying public sector outputs, it is difficult to draw firm conclusions regarding the uses of the additional taxable capacity in the two towns, and even more difficult to pinpoint individual services that have been extended or improved.[32]

Table 24 shows the rate at which assessed value in each town is taxed. The fact that the Plymouth rate is nearly twice that of Waterford, however, should not be interpreted as a measure of differential tax burdens, because of fractional assessment of market value. Most significant is the fact that neither town has maintained its previous level of taxation, even though one might well expect the average assessment ratio to have fallen over time.[33] This suggests that an increasing tax rate on assessed value would be necessary to keep constant the rate at which market value is taxed.

Table 24

Property Tax Rates in Plymouth, Massachusetts and Waterford, Connecticut

	Published Tax Rate	
	Waterford (in mills)	Plymouth (in mills)
1966	42.0	74.4
1967	42.0	78.8
1968	42.0	92.8
1969	42.0	97.2
1970	43.0	88.4
1971	43.0	79.6
1972	38.0	96.0
1973	31.0	76.4
1974-75	31.0	76.0

Source: *Annual Report:* Town of Waterford, 1965-1975.
Annual Report: Town of Plymouth, 1965-1975.

Waterford maintained a relatively constant tax rate over the years shown, but in the final year of our study reduced the tax rate by nearly one-third. As noted above, however, the rate in Waterford was artifically held at a level higher than normal for a portion of this period to accumulate funds to finance a change in its fiscal year.

In Plymouth, the tax rate began to decline as early as 1970. The one exception to this pattern, evident in 1972, represented an instance in which the town chose to finance a significant capital item out of current expenditures, a luxury seldom possible for modern local governments.

Table 25 shows the proportion of general revenues that property taxes comprised of total revenues for the two towns, as well as reference statistics for the United States and Massachusetts and Connecticut towns. As the first two columns indicate, the property tax has been a declining source of revenue nationally, but has been stable for Connecticut towns and has actually increased for Massachusetts towns. While these data do

Table 25

Property Taxes as a Proportion of Local General Revenue in Plymouth, Massachusetts and Waterford, Connecticut

Years	All U.S. local governments	All U.S. municipalities	Massachusetts townships	Connecticut townships	Waterford	Plymouth
1966-67	0.45	0.38	0.67	0.71	0.70	0.52
1967-68	0.42	----	----	----	0.68	0.51
1968-69	0.41	----	----	----	0.69	0.56
1969-70	0.40	0.34	----	----	0.66	0.66
1970-71	0.39	0.32	----	----	0.70	0.69
1971-72	0.39	0.31	0.75	0.71	0.68	0.73

Source: Columns 1-2, *1972 Census of Governments*, Vol. 6, No. 4.
Columns 3-4, *1967, 1972 Census of Governments*, Vol. 4, No. 5.
Columns 5-6, *Annual Reports:* Town of Waterford (various years).
Annual Reports: Town of Plymouth (various years).

not actually reflect the impact of the Millstone and Pilgrim facilities, since only a fraction of their value was entered on the tax roll in fiscal 1971 as shown in Table 25, they do serve to place the Plymouth and Waterford experience in perspective with that of similar towns.

Waterford generally follows the Connecticut pattern, with a slight decline in the proportion of revenues supplied by the property tax over the five-year period shown. This was due to an increase in revenues obtained from other local tax sources that exceeded growth in property tax revenues. The yield from the property tax grew by 106%, while overall revenues grew by 110%. For all state towns, total revenue grew by an average of 95%.

Plymouth, in contrast, experienced a rapid increase in the share of local revenues accounted for by property taxes, though still below the state average. This tendency generally mirrors that of other towns in the state, but nonetheless is much more pronounced. In Plymouth, property tax revenues grew by more than 200% over the five-year period, while total revenues increased by only 118%, resulting in a much decreased share for nonproperty tax sources. During this same time, property tax receipts for all towns in the state increased by 94% and total revenues by 73%.

More striking than the overall scope of activities in each town, however, is the change relative to population growth. Here the two towns present distinct contrasts. Plymouth increased in population significantly over the period, while Waterford grew only slightly. Therefore, Plymouth's rapid revenue growth represents only a per capita revenue increase of 74%, compared to Waterford's 98% increase. Thus, a major effect of the increased tax base was to present each town with a much more varied set of options than those found in the typical governmental jurisdiction. It is, moreover, somewhat surprising to find a similar response in terms of property tax rate changes, in view of the revenue comparisons.

Perhaps the most useful predictive statistic for analyzing the fiscal impact of siting a power reactor would be the tax rate elasticity relative to the plant proportion of the tax base.[34] This would indicate, for example, that if a power station increased the property tax base by a given percentage, the tax rate would change by a corresponding percent. In fact, so many additional variables influence tax rate levels that it would be quite difficult, if not impossible, to estimate such a statistic accurately and with confidence, particularly if it were to have applicability to other jurisdictions. Among the intervening variables of greatest importance is the assessment ratio, which is used to define the rate of taxation on market value. Moreover, the elasticity of greatest usefulness would measure not marginal changes, but very large ones, a significant departure from the common definition of an elasticity. Thus, undertaking a thorough analysis of the problem is beyond the scope of this analysis. Nonetheless, because of its potential usefulness, some calculations will be made in an attempt to place a limit on the range this statistic might take, based on the behavior evident in Waterford and Plymouth.

When these calculations were carried out for Plymouth and Waterford, individual years show little or no pattern, particularly for Waterford, which retained a constant tax rate over a large part of the period under study. When the calculations are carried out for the period spanning the life of each plant through 1973, however, the values generated were reasonably consistent. For Waterford the calculated elasticity was -0.27 and for Plymouth it was -0.18. If interpreted literally, these elasticities indicate that for each percent increase in the defined price ratio, the rate of taxation would decline by 0.27% in Waterford and 0.18% in Plymouth. In practical terms, they suggest that tax rates may be expected to fall over a period of years as the effects of the large tax base increase become cumulative, but that the relative change in the base greatly exceeds the relative change in rate. In other words, the localities under consideration showed no inclination to maintain a constant level of expenditure with a greatly reduced tax rate. It also appears from this evidence that the expected assessed value of the power station multiplied by the tax rate prior to construction probably will overstate the tax revenues associated with the siting.

In view of the significant differences in population growth experienced by Plymouth and Waterford, and the pattern shared by each town of operating within a more narrow range of tax rate options than are in fact available, one might expect substantial differences in the division of local budgets among possible service alternatives. To address this area, local government services are divided into two categories — education and other expenditures and will be discussed in the next two sections.

4.3 Educational Expenditure Impacts

Recognizing that the provision of elementary and secondary education remains the principal activity of most localities, this section examines the impact of increased revenues on local educational expenditures.

Since population change is age specific, with families that migrate commonly falling within age groups containing school-age children, one can predict *a priori* that education expenditures would play a key role in shaping the fiscal behavior of Plymouth. Indeed, analysis bears out this expectation.

For 1967, educational expenditures made up 63 percent of the local budget in Waterford, but only 35 percent for Plymouth. Over the five-year period to 1972, education's share of the Waterford expenditure package fell to 55 percent, while in Plymouth it increased to 43 percent. Nonetheless, in per capita terms, the rates of increase were nearly identical, with each rounding to 72 percent. This phenomenon of great increase in expenditures in education is compounded by the extremely low level of per capita noneducational expenditure in Waterford that existed in 1967 and which increased by 240 percent over the period. This contrasts with a 25 percent increase in per capita noneducational expenditures in Plymouth over this same period, as will be further discussed in Section 4.4.

Perhaps the prime determinant of these expenditure differences lies in the number of students in each town during these two periods. As illustrated in Table 26, school enrollments more than doubled in Plymouth over the eight-year period following 1967. In sharp contrast, Waterford enrollments scored an absolute decline over this same period.

For Plymouth, the cause of this sharp increase was two-fold, stemming not only from the rapid growth in population, but also from the introduction of a state mandated kindergarten program. In Waterford, with a basically stable population, students apparently aged out of elementary and secondary age groups more rapidly than they were replaced. This phenomenon is shown most clearly in the enrollment ratio of each town, the ratio of students to total population. Between 1967 and 1975, this ratio declined in Waterford from 0.27 to 0.23, while in Plymouth it increased from 0.18 to 0.27. For this reason, educational expenditure per student, rather than per capita, better explains the impact of expenditure changes on the relevant service recipient group. By this measure, Waterford saw an 87 percent gain in

Table 26

Population, School Enrollments, and Educational Expenditures
in Waterford, Connecticut and Plymouth, Massachusetts

	Waterford, Connecticut					Plymouth, Massachusetts				
	Population	School enrollment[a]	Enrollment ratio	Per capita expenditure	Per student expenditure	Population	School enrollment[a]	Enrollment ratio	Per capita expenditure	Per student expenditure
1967	16,495	4,433	0.27	148	550	16,060	2,948	0.18	142	776
1968	16,679	4,518	0.27	165	607	16,696	3,225	0.19	153	794
1969	16,863	4,574	0.27	180	664	17,332	3,386	0.20	173	886
1970	17,047	4,524	0.27	206	776	17,968	3,743	0.20	196	940
1971	17,227	4,441	0.26	230	892	18,606	3,843	0.21	217	1,048
1972	17,507	4,359	0.25	255	1,026	20,265	4,253	0.21	244	1,164
1973	17,787	4,251	0.24	273	1,143	21,924	4,709	0.22	NA	NA
1974	18,067	4,314	0.24	291	1,219	23,584	5,980	0.25	NA	NA
1975	18,348	4,159	0.23	NA	NA	25,242	6,728	0.27	NA	NA

Source: *Annual Report*: Town of Waterford (various years).
Annual Report: Town of Plymouth (various years).

Note: Population figures are taken from the *Census of Population*, 1960-1970 and from estimates by the Federal State Cooperative Program for Population Estimates (1974). Estimates for intermediate years were calculated by linear interpolation.

a. School enrollment figures are based on the school year 1967. Figures refer to the number of students enrolled in the 1966-67 school year (September 1966 to June 1967).

expenditures, relative to Plymouth's gain of 50 percent between 1967 and 1972. Were data available for the last three years, in which major changes in the enrollment ratios continued, an acceleration of this trend would likely be visible.[35]

4.4 Noneducational Expenditure Impacts

Turning to noneducational expenditures, it is quickly evident that close comparison of expenditure levels can be misleading. As is illustrated in Table 27, the major difference between noneducational expenditure levels is buried in an "all other" category, and primarily manifested through a rather high entry for Plymouth. Most of the difference between the towns for this column originates in state supported activities where the locality acts on behalf of the state, and in general, these expenditures are compensated through state-aid programs. For example, one large component of this class is veterans benefits, and another is pensions and retirement, neither of which greatly affects local budgets in Connecticut. For this reason, this activity is grouped together, and for our purposes can be ignored.

A second reason for differences in expenditure totals is similar to that discussed with respect to education: put simply, the workload, or group served, can be different in size or kind. Unfortunately, once one moves out of the education area, where numbers of students establish workloads reasonably well, it is difficult to factor accurate comparisons into the analysis. Plymouth, for example, experiences a large influx of population during the summer months, from owners of second homes, renters of summer cottages, and tourists. The degree to which this consideration causes Plymouth to outspend Waterford in areas of public safety or public works is not easily documented. More importantly, we will attempt to note instances of rapid change and departure from past patterns.

Moving from left to right across Table 27, one finds Waterford and Plymouth devoting approximately equal per capita amounts on general administrative services. Plymouth outspends Waterford in areas of public works (roads, sewers, etc.) and public safety (police and fire); however, in each case, the Waterford rate of increase exceeds that of Plymouth.

Table 27

Noneducational Expenditures Per Capita*
Plymouth, Massachusetts and Waterford, Connecticut

	Total		General control		Public works		Public safety		Debt service and capital outlay		All other		Waterford revenue account
	Plymouth	Waterford	Plymouth	Waterford	Plymouth	Waterford	Plymouth	Waterford	Plymouth	Waterford	Plymouth	Waterford	
1967	$262	$ 88	$12	$11	$41	$13	$39	$10	$ 35	$40	$133	$12	$ 0
1968	425	104	13	11	43	14	44	12	208	37	115	27	0
1969	278	143	13	16	48	16	48	15	97	40	69	21	33
1970	286	159	16	19	53	26	56	19	81	61	77	15	16
1971	305	171	16	25	56	32	64	23	88	55	78	17	17
1972	327	380	19	22	59	32	63	26	109	78	77	19	34

Source: *Annual Report*: Town of Waterford (various years).
Annual Report: Town of Plymouth (various years).

*Per capita dollars.

Debt service and capital outlay areas provide the towns with an opportunity to spend potential revenue increases, and Plymouth has not issued a long-term bond since the siting of the Pilgrim station, preferring to cover all capital outlays (e.g., schools, water tower, firehouses, etc.) through current budget. Waterford generally also follows this pattern, but has recently issued some bonds to finance a major reworking of its sewer system and installation of a water system.

Still, it should be noted that capital outlays do not occur evenly over time and are not always associated with such major variation in tax rates as was observed above in Plymouth. In many instances, opportunities to accept matching grants become available from modest rate adjustments. Connecticut, for example, has a matching fund for the construction of school buildings which now appears in some danger of being reduced, and this contingency has sparked local discussion of replacing a currently viable building (cost – $14 to $16 million) rather than risk being frozen out at some future date.[36] It is unlikely that towns in a less firm fiscal position could seriously consider such an outlay.

The final column in this table shows revenues Waterford accrued in an account to provide for a transition to a uniform fiscal year. Although this fund no longer exists, it appears to have acted as a balancing item which led to a stabilized tax rate over the period when Plymouth experienced tax rate reductions. Since this account has now been closed and local governments are precluded by law from operating at a surplus over a period of time (The Waterford 1973-74 budget surplus was $1.9 million.), the Waterford tax rate may well continue to decline, unless maintained to finance capital outlays. This latter option is a strong possibility, in view of the recent decision to conduct extensive sewer and water main construction.

Much of Plymouth's increase in per capita spending can be attributed to increases in public works and public safety programs. As reported in Chapter 3, Plymouth has responded to its growth by forming a separate public works department responsible for the provision and maintenance of local public facilities, particularily in the newly-developed subdivisions in West and South Plymouth. According to the Director of Public Works, approximately 20% of Plymouth is presently serviced by sewer connections and approximately 80% has town water. It is not known exactly what percentage of the community lacks adequate roads and sidewalks, though it is believed to be somewhere in the vicinity of 20%.[37]

The police force has increased from 35 persons in 1970 to 55 persons in 1975; the fire department has increased its force from 35 men in 1970 to 84 men in 1975.[38] Presently, town officials are building a sixth new fire house in West Plymouth.

In Waterford, the tie-in to New London's sewer system was bonded at $23.8 million, a move forced by a 1975 state mandate to the local area to upgrade its services.[39] In the past year the public works budget has almost doubled, and is now set at $1 million, primarily for sidewalk construction and purchases of heavy equipment. The town has also bonded $1.5 million over ten years to cover the cost of the installation of a water system, and appropriated $800,000 to install water mains. Another noneducational expenditure was $508,082 for the addition to the public library.

Our survey indicated the desire of Waterford residents to increase the quantity and quality of public services and facilities.[40] Of primary importance were the upgrading of the sewage system, an addition to the public library, and the construction of a new high school and civic center. Local public officials appear hesitant to expand public services to the desired levels lest uncontrolled growth and development follow. This has been the principal justification for relatively restricted improvements in the area of public works, particularly the addition of sewers and tie-in with the New London system.

While this recounting of expenditure patterns cannot firmly establish the distribution of benefits accruing to the increases in taxable capacity experienced by Plymouth and Waterford, and in fact points to the danger in examining expenditure changes apart from such basic elements as population change, it has highlighted the flexibility with which each town has been able to approach public service budgeting. Clearly, tax rate increases that have occurred can be very easily tied to service increases, capital purchases, or in Waterford's case to the provision of funding for a transition period during which many similar towns found it necessary to issue debt. Moreover, even with declining tax rates, expansion of expenditures across a broad spectrum is evident. The degree to which these changes reflect better or additional public services, unfortunately, cannot be accurately factored out within the present framework, and, beyond an examination of enrollment changes, no attempt has been made to do so.

4.5 Impacts of Construction Labor Force

Unlike most large energy-related construction projects in rural areas which may induce enormous changes in host communities (e.g., population increases, pressures on services, and social stress),[41] there were few construction impacts discernible in either Plymouth or Waterford. There was agreement on this statement from all local sources: utility, unions, local leaders, and other citizens. The most important reason for this lack of significant impacts during the construction phase seems to have been the fact that most of the labor force chose to commute to the work site from the surrounding regions rather than relocate to the site. Officials at Boston Edison state that most of the construction force of Pilgrim I commuted from localities in or near the Boston and Brockton areas. Officials at Northeast Utilities stated that most construction workers for Millstone Units 1 and 2 were hired from local union halls in New London and Norwich (although some came from as far away as Hartford, Bridgeport, and New Haven) and chose to commute from surrounding areas rather than move directly to the work site.

4.5.1 Impacts on housing and land values

Due to dispersed labor force commuting patterns, there appeared to be little impact on housing and land values in either community during the construction period. Some residents were of the opinion that high construction worker wages forced a rise in residential property prices in Waterford; however, we could find no evidence to substantiate this belief. Prices for residential property were rising substantially in

Plymouth during the construction period, however. In the opinion of local realtors, this rise tended to be linked to local, regional, and national economic trends rather than to a site-specific construction project. The Chief of Police in Waterford mentioned that some workers rented rooms in local motels during the week and returned to their families on weekends. Housing occupancy rates in both Plymouth and Waterford remained high and the few rental properties available showed an increase in occupancy. Some workers who did relocate to the site for a short time in Plymouth rented or purchased local summer cottages, winterized them and thus, helped up-grade the existing housing stock.

4.5.2 Community-construction worker interaction

Minimal social interaction took place between local community residents and construction crews in either Waterford or Plymouth. Interviews with local Chiefs of Police and some tavern owners suggest that disputes erupted in local taverns after working hours, but these appear to be no different in type or quantity than those at other large construction sites. Table 28 shows that both criminal arrests and total arrests increased in both communities since construction began at both sites. These data are not of sufficient detail to suggest that the influx of construction workers into the area was the major cause of this increase, in view of rising crime rates nationwide during this period.

A strike by 47 workers during May 1973 (38 production and maintenance workers and 9 engineers of Office and Clerical Union #387 against Boston Edison), brought local police to the site for several weeks in Plymouth, but few other disturbances were noted. The Plymouth Fire Chief stated that several fires erupted in construction storage areas but were easily controlled.

Few other impacts were noted during construction. Local interviews suggest that construction noise emanating from the site during daytime hours was not a concern to residents in either community due to the isolation of the plants from more densely-populated residential areas. Likewise, high-intensity lighting used by night crews, a source of local complaint at other large construction sites,[42] was not perceived as a problem by local residents at either site.

Table 28

Criminal Arrest Rates and Total Arrest Rates for Plymouth and Waterford, 1960 to 1974

	Plymouth		Waterford	
Year	Criminal	Total*	Criminal	Total*
1960	410	581	NA	NA
1961	474	644	NA	NA
1962	511	665	136	358
1963	592	743	129	321
1964	NA	NA	NA	NA
1965	505	732	140	363
1966	NA	NA	NA	NA
1967	441	836	289	844
1968	NA	814	178	871
1969	387	1139	NA	NA
1970	758	1230	310	894
1971	748	1275	NA	NA
1972	644	1143	251	723
1973	856	1589	288	1070
1974	NA	1619	401	1208

Source: Annual Reports for Plymouth Massachusetts, 1960-1974 and Annual Reports for Waterford, Connecticut, 1960-1974.

*Total = criminal and traffic arrest rates.

4.5.3 Construction worker traffic

One direct impact that can be identified in both communities was construction worker traffic.[43] The isolation of the sites and the limited number of secondary and feeder roads leading to and from the sites from other major arteries created some problems for residents and town officials in both host communities. In Plymouth, only three secondary roads connected the plant site with the two major arteries (Routes 3 and 3A) feeding into the surrounding region. Some residents stated that they had scheduled appointments around commuting hours in order to avoid construction worker traffic. The police chief mentioned some speeding by workers but managed to control most of it with the use of radar surveillance and the assignment of a police officer to the entrance of the construction site each night.

In Waterford, most of the commuting work force came to and left Waterford via I-95 or the Connecticut Turnpike and converged on one main road in Waterford leading to the construction site. The volume of traffic became so heavy during peak commuting hours that the Chief of Police rerouted traffic and created a separate truck route for plant vehicles. Signs prohibiting trucks were placed on certain town roads.

Motor vehicle arrest records were investigated in both communities to determine whether or not a noticeable trend in arrest rates could be observed during the construction periods. Due to differences in the reporting of crime statistics at the local level, change was difficult to assess. While there was a noticeable increase in motor vehicle arrest rates for most years in both communities (Table 28), the information available is not detailed enough to permit more definitive statements.

4.6 Planning, Coordination, and Growth Management Impacts

Since the construction of the nuclear reactor, the town of Plymouth has grown from a population of 18,606 in 1970 to approximately 28,000 in 1975. The influx of many new residents appears to have brought about changes in the amounts and types of public services offered as well as changes within the local political infrastructure. Waterford, on the other hand, experienced rapid growth well before the nuclear plant was built, and has grown only moderately since 1970. It remains a single-family residential community primarily because of strict enforcement of local zoning ordinances. Due to the increased property tax base, the community has experienced a generally increasing level of public services.

The growth which took place in Plymouth appears to have been a response to a variety of factors, only one of which was Boston Edison's siting of Pilgrim I. From interviews, observations, and newspaper accounts, other factors which seem to be influential were: its large land mass and sparsely settled conditions (Plymouth's density was 191 persons/sq. mile in 1970); it physical setting (17 miles of mostly undisturbed ocean coastline and approximately 365 lakes and ponds); its accessibility to the resort area of Cape Cod and to Boston via Routes 3 (constructed in the 1960s) and 3A (constructed in the 1950s); its position in the 1960s as the only major retail center between Quincy on the South Shore and Hyannis on Cape Cod; its relatively low land prices (in 1968-69 non-coastal land sold for approximately $750 to $1000 per acre); and its location directly in the path of advancing southern suburbanization of the Boston metropolitan area.[44]

Prior to 1973, when new zoning ordinances were approved for the community, there were few existing zoning or subdivision regulations in Plymouth. According to local builders and real estate firms, Plymouth had few constraints on development, unlike surrounding communities such as Duxbury and Marshfield which had stricter enforcement of zoning regulations, higher land acquisition costs, and more extensive housing codes and inspections. These factors, plus Plymouth's other notable attributes, encouraged local developers and some large developers in the Boston and Brockton areas who were anticipating the increased tax revenue from the nuclear plant (and hence, a stable tax rate) to purchase land for subdivision development. Land developers and contractors purchased hundreds of acres primarily in the least developed areas of town (West and South Plymouth) at prices ranging from $250 to $500 per acre beginning in approximately 1967, prior to actual plant construction.[45] Land was subdivided into lots ranging from one-quarter acre and up, and homes sold in the price range affordable by younger families.[46] The construction of this housing and its purchase by families looking for a community with a stabilized tax rate was a major factor in the rapid growth of Plymouth after 1969.

Realizing that the community might be doubling in size and fearing further unplanned growth, with the accompanying need for increased public services, local officials adopted two significant measures in 1973, five years after the construction of the nuclear plant had begun: (1) the development of strict land use, zoning, and subdivision controls as part of a more orderly, rational growth policy[47] and (2) the hiring of an urban planner whose primary task was to develop a comprehensive plan for Plymouth.

The siting of Pilgrim I in Plymouth, as previously mentioned, cannot be said to have been the primary causal factor for the extensive community development. Other local and regional events were also contributing factors. The siting of the plant might be viewed, however, as a supporting factor which contributed extensively to the property tax base of the community and thus added fiscal resources and attractiveness to external developers. This enhanced Plymouth's growth trend.

Unlike Plymouth, Waterford maintained an efficient, organized Planning and Zoning Commission responsible for land use policies within the town prior to the existence of the nuclear plants. Waterford had previously adopted (1966, revised in 1972) and enforced strict zoning ordinances, curbing unrestricted and unwanted growth.[48] Hence, while the siting of the nuclear plants has greatly increased pressure from many external factors to expand, Waterford's land use pattern has changed little since the nuclear plant construction began.

In contrast to Plymouth, Waterford has not experienced a recent surge of growth, as can be seen from Table 17. It has maintained one of the lowest growth rates in the southeastern Connecticut region in the last 15 years. In addition to the large lot residential zoning enforced by the Planning and Zoning Commission, Waterford appears to be restricted in its future land use options by environmental constraints. According to the Connecticut Natural Resource Maps, prepared for the Waterford Commission by Connecticut College in 1972, approximately 26% of the land within the town is developed, whereas one-third of the undeveloped acreage is wetlands upon which building is prohibited. This reduces the total of land available for future development to approximately 40%.

4.7 Local Political Impacts

In the many interviews that were held with officials and community leaders in both towns, most expressed some concern over recently becoming host to such a large facility. While the increase in property tax revenues is viewed as primarily beneficial to their communities, they note the new decisions which face them in balancing competing interests within their communities. Both communities have hired full-time planners to help guide local growth policies, and full-time public works directors to oversee local public service development. In addition, Plymouth hired a full-time town manager in 1974 to manage and coordinate local affairs.

In our judgment, both communities have experienced changes in the style of decision making as well as in budgetary priorities and changes in the expectations of the community concerning the local government's role in promoting community development. In Plymouth, where into the 1960s, 24 families held approximately 34% of the elective offices in the town, newcomers have recently become more involved in the political process and have made new demands on local services.[49] This increased political participation of new residents has led to debates in the community over the provision of needed services, as in the recent controversy over increased capital and operating appropriations for the Plymouth school system.

In Waterford, the influx of additional revenues appears to have exacerbated existing tensions between community groups. One example is the disagreement between some professionals who work outside Waterford primarily in the defense-related industries and public officials who reside and work in Waterford. The disagreement centers around community needs and priorities as reflected in the allocation of funds. These officials, who appear fearful of losing the revenue by state mandate, are extremely cautious about the allocation of funds for major capital expenditures. The professional community, on the other hand, seems more willing to spend money for these purposes due possibly to higher expectations of needed community services.

The relationship between these "nuclear towns" and their surrounding neighbors appear to be somewhat strained by the nuclear plant sitings. From local newspaper accounts and our discussions with state and regional officials, Plymouth's neighboring communities appear envious of the additional property tax base and the new public services they can provide. Plymouth's neighbors also express concern over the transportation of nuclear waste and the construction of transmission lines and corridors within their borders. This became particularly apparent in October 1975 when a truck carrying spent fuel overturned in neighboring Middleboro. Local editorials point to the fact that while neighboring communities receive few of the positive benefits, they may receive substantial negative impacts.[50]

In Waterford, the favorable financial position has exacerbated already existing tensions between Waterford and neighboring New London, two communities which have a long history of urban-suburban disagreements. New London, which has a declining population, a substantially higher tax rate than Waterford and a population increasingly dependent on government subsidies, looks with envy upon its neighbor.[51] Most New London officials who we consulted viewed the Millstone plants as another "plus" for Waterford and believed that the siting would only increase the social distance between the two communities and enhance the political disagreements between them.

4.8 Utility-Community Relationship Impacts

Where relationships tend to be somewhat strained between each community and many of its neighbors, relations with the utilities appear to be mostly stable and cordial. In Plymouth, community leaders express overwhelmingly positive attitudes toward Boston Edison management and plant operators. Confidence is expressed not only in their managerial expertise but also in the utility's knowledge about the nuclear industry. Local fire and police departments have had courses in nuclear safety and evacuation procedures conducted by the utility. Copies of all evacuation manuals are obtainable at the town library. As required, Boston Edison provided a decontamination trunk unit to the Jordan Hospital in Plymouth when the hospital built its new emergency room in 1973. In cases of emergency, the unit provides surface decontamination for one or two persons at a time.

Boston Edison has also developed a recreation area providing public access for fishing from the breakwater near the plant's discharge canal, a comfort station and shelters on the beach, and parking for approximately 100 automobiles. A footbridge has been built to permit fishermen access to the breakwater, benefiting both local residents and tourists. According to local Chamber of Commerce officials, many of the tourists who visit Plymouth and its year-round historical attractions now visit Boston Edison's Visitor Center and make arrangements with the utility to tour the plant.[52] Some concern was expressed early during the construction phase by residents that the nuclear facility would seriously affect the town's tourist industry but this concern appears to be unsubstantiated by subsequent events. Both local and state Chamber of Commerce officials state that in general tourism has not been negatively affected and that rates remain relatively high. It remains to be demonstrated whether or not Pilgrim's presence has affected sport fishing and other marine recreational activities in the vicinity of the site.

Similarly to Plymouth, Waterford officials express positive attitudes toward Northeast Utilities. All elected town officials have had nuclear safety courses offered by the utility, and the Chief of Police routinely maintains contact with plant administrators. A "hot line" has been installed linking plant operators to the Police Chief and First Selectman. In fulfilling legal requirements, the utility has helped finance a decontamination unit in the local hospital in New London and has consulted with the hospital staff on the development of a radiation disaster plan. The utility has also reimbursed the town for losses incurred for beach property and water frontage since construction of the plants, and has built and maintained a baseball field for public recreational activity on utility-owned buffer land adjacent to the site. They have also agreed to establish a communications director to deal with area towns concerning any operating problems at Millstone.

What this suggests is that neither the utility nor the community desires to endanger their rather unique relationship. The utility, not wishing to cause objections to its presence or to its possible future construction plans, remains exceedingly cordial to town officials. The towns, on the other hand, do not wish to disturb the favorable financial position they find themselves in. Hence, the relationship evolves around a series of tradeoffs wherein both parties have substantial amounts to lose if the relationship falters.

4.9 Impacts on Attitudes and Local Responses

The siting of the nuclear generating units, though perceived with some skepticism by neighboring communities, is favorably received by a majority of residents surveyed in both Waterford and Plymouth.[53] Survey results suggest that approximately 71% approve of the siting in Plymouth, while an overwhelming 87% in Waterford approve as shown in Appendix B. These findings are higher than the approval percentages (approximately two out of three) in the national Ebasco survey in 1975 and in the ORNL Hartsville Surveys in 1975.[54]

In both Plymouth and Waterford, the primary reason given for the favorable attitude was the substantial increase in the tax base of the communities and subsequent stabilized tax rate (27% in Plymouth, 21% in Waterford). Primarily due to this economic impact and the perceived lack of any significant ill effects (even though both plants have experienced nonroutine incidents leading to temporary shutdown), most residents would permit construction again (87% in Waterford, 71% in Plymouth).

The 71% approval rating in Plymouth suggests that a majority of Plymouth residents perceive the plant siting as beneficial to them. Those residents not expressing approval mentioned concerns about nuclear safety and the impact of the plant on growth and development within the community. Almost unanimous approval of the nuclear stations was found in Waterford. The majority of Waterford residents, having lived with nuclear power since General Dynamics Shipyard built the Nautilus in nearby Groton in 1955, appear to be favorably disposed toward nuclear power and appreciate the favorable fiscal situation which the nuclear plants have provided. Apprehension over the proposed siting of an oil refinery in the Quaker Hill Section of Waterford, the expansion of Connecticut Route 11 to converge with two other main state highways near the central business district, and the proposal to build a regional shopping center are seen as more controversial issues with greater negative impacts for residents than the siting of the nuclear plants.

The highly favorable ratings expressed toward the nuclear plants in both communities, however, are accompanied by increasing apprehension expressed by decision makers and local residents over the possible loss of revenues generated by the plant either by general depreciation or state mandate. In both Massachusetts and Connecticut, bills introduced by state legislators are pending in the state legislatures to disperse utility tax payments more evenly throughout the state.[55]

This fear of potential loss of revenue in both communities appears to have caused town officials to take anticipatory measures to maintain the current levels of revenues. In Plymouth, for example, the Industrial Development Commission seeks business to locate within the community to offset a possible eventual loss of revenues. While the development of the 212-acre industrial park on Route 44 in 1967 was initially viewed as a solution to Plymouth's high unemployment rate and the 1968 closing of the Cordage plant (one of Plymouth's largest industries), it is now perceived as a major source of income if the utility's payments were taken from the community.[56] To illustrate, Table 29 shows that as of January 1975, the industrial park and recently renovated Cordage Park contained 23 firms and 567 employees, 63.5% of whom were Plymouth residents.

Table 29

Employment in the Cordage and Industrial Parks in Plymouth, 1975

Type of Business	A Firms	B Employees	C Plymouth Residents	D Percent
Manufacturing	17	473	297	62.8
Wholesale and Retail Sales	4	43	38	88.8
Transportation, Communication and Other Public Utilities	2	51	25	49.0
Total	23	567	360	63.5

A: Total number of firms in each category.
B: Total number of paid employees as of January 1975.
C: Number of Plymouth residents employed.
D: Percent of employees that are Plymouth residents.

Source: Plymouth Planning Board, 1975.

In Waterford, town officials have also actively begun to seek industrial developers for their recently developed Industrial Triangle. Town officials are presently courting local developers who are proposing a Regional Shopping Center at the commercial center of the town.[57] Located just south of the

Industrial Triangle and at the intersection of the Connecticut Turnpike, Route 95, and proposed Route 11, the Shopping Center, consisting of 850,000 sq. ft. of retail floor space, would generate 27,200 trips by shoppers per day and would significantly change vehicular activity adjacent to the site.[58] The encouragement of such commercial activity, while seeming incongruous with stated goals of controlled growth and development, originates in part from the increasing fear of potential loss of utility revenue.

In summary, residents of Waterford and Plymouth appear to have accepted the nuclear plants with few reservations; the primary reason is the increase in the towns' property tax base. Few residents perceive any ill effects from their nuclear neighbor. The potential loss of these revenues does appear, however, to be a real concern of town officials. In both communities, steps are being taken to maintain the current levels of revenue through the development of alternative sources of revenue.

5. CONCLUSIONS

5.1 Summary

The post-licensing study was undertaken to investigate socioeconomic impacts upon people and communities resulting from the construction and operation of nuclear power plants. To assist in this task, a social impact assessment model was developed to structure data collection and analysis, and to suggest relationships for empirical analysis. It was assumed that facility-related inputs such as human resources, generated revenues, facility characteristics, and the licensing and regulatory process, interacting with the existing community social, economic, and political structures produced measurable impacts.

The most significant impacts found were fiscal effects resulting from revenues generated from local property taxation on the facilities. By 1975, these revenues comprised nearly 50 percent of the property tax revenues raised in Plymouth and nearly 60 percent of the property tax revenues raised in Waterford. The increase in the tax base presented each community with a more varied set of expenditure options than would ordinarily have been found without increasing the tax burden on local populations. Thus, for example, Plymouth was able to meet increased demands upon its services due to increased population growth, while Waterford was able to upgrade its services at a more rapid rate than ordinarily would have been possible.

Other impact categories were touched upon during the course of the study, but no detailed statistical analyses were attempted. Table 30 reports a general overview of the impact categories for Plymouth and Waterford with brief qualitative entries describing what was found.

Although the two communities were selected to represent areas in which only one of the four input categories was significant (general revenues), the study has indirectly addressed questions regarding why other impacts were limited. It has been suggested, for example, that the choice of sites located in population growth areas, areas of high population density, and with large labor sheds — those having a "resident" regional labor force — would normally eliminate most of the "boomtown" socioeconomic impacts from the construction period. As the study has shown, construction labor force impacts seem to have been confined to commuting patterns and traffic congestion. Additionally, it would seem that some land use and community development impacts were averted by local planning and zoning policies.

Table 30

Summary of Impacts by Community

Impact Category		Community	
		Plymouth	Waterford
Fiscal	Construction	negligible	negligible
	Operation	substantial	substantial
Political	Construction	no data	no data
	Operation	moderate	moderate
Labor Force	Construction	negligible	negligible
	Operation	negligible	negligible
Land Use and Development	Construction	no data	negligible
	Operation	moderate	negligible
Demographic	Construction	no data	no data
	Operation	no data	no data
Service Sector	Construction	moderate	moderate
	Operation	moderate	moderate

Two limitations of the post-facto approach are important to note for this study. First, there may have been other impacts which were not identified due to the nature of the approach. Unless an issue analysis was specifically undertaken, including extensive reviews of public records, such concerns would not ordinarily be visible in a general post-licensing study. Second, as mentioned earlier, one of the drawbacks of a field study is that unmeasured or unexamined factors may account for some of the causation attributed to the facility. For example, it was found that both communities hired full-time planners and directors of public works. The linkage to the nuclear power plant, in both communities, is but one possible explanation. However, as the fiscal analysis clearly shows, when appropriate data are available and reasonable research questions are asked, post-facto field studies can produce very useful results.

5.2. Future Research

Several courses of action present themselves for guiding future post-licensing type research and social impact assessment work. First is a further exploration of the use of the social impact model, presented earlier, as a method of structuring the causal chain of events associated with nuclear power plant construction and operation. Of the four "inputs" suggested, the two cases examined here only focused on generated revenues or taxes. Other quasi-experimental designs to isolate the impacts of other inputs would be extremely useful in confirming the validity of the impact model. One suggestion, which is currently under study at Oak Ridge National Laboratory, is to extend the field-study approach to examine the combined impacts of human resources and generated revenues in two more communities. As shown in Figure 4, by cross-classifying the two key input variables, we arrive at four possible combinations of inputs which could be examined. The Plymouth/Waterford study may be classified as having high generated revenues, but low human resources inputs (immigrants). The current study under way examines the post-licensing case of two communities where both human resources and generated revenue inputs are high. The continuation of the systematic examination of the proposed social impact model will be extremely useful in understanding the relationship between suggested inputs and community-level social impacts.

Human Resources (inmovers)		Generated Revenues: High	Generated Revenues: Low
	High	Post-Licensing II	
	Low	Plymouth and Waterford (PL-I)	

Fig. 4. Cross Classification of Key Input Variables.

A second research need is the examination of impacts over time. This approach would be useful for two reasons. First, it would help in the assessment of the evolution of impacts as they affect community development. Of more immediate interest to the Nuclear Regulatory Commission is that the short-term impacts could be distinguished from long-term impacts. This would be useful in designing mitigation strategies and planning efforts. As environmental impact statements have become more sophisticated in their analysis of social impacts, time-series data are more readily available for analysis, and could be gathered from a number of sources with minimal effort.

As a corollary to the time-series effort, it might be a useful policy to establish one or two "experimental communities," where a large-scale data collection effort focusing upon social-indicator information would be undertaken. The data from these "experimental communities" could be made available to answer specific research questions (i.e., visual impacts, worker integration, community conflict) or serve as an example for utilities and other communities of the types of data available or relevant for monitoring impacts. Finally, the "experimental communities" could serve as laboratories for impact management projects (a significant departure from the current trend of funding "handbook" studies).

A major question which might be considered is the linkage between regional and community-level impacts. While these concerns are implicitly addressed in environmental impact statements, few research efforts address the linkages. For example, in the Plymouth/Waterford case, it would have been useful to devote more time to the examination of the relationship of regional economic factors to community impacts or the impacts from the community upon the regional labor market. It is very difficult to examine these trends as part of a community study due to the limitations of time, effort, and data. However, as separate but complementary studies, such efforts would be extremely useful.

A final recommendation regarding future research deals with a basic theoretical question regarding the social impacts of nuclear power plants, as opposed to other types of facilities. There might be impacts unique to nuclear facilities, but the possibility exists that the impacts are common to all power-related facilities or all large industrial facilities. To answer some of the questions, a research design as shown in Figure 5 might be suggested. A comparison of nuclear and coal-fired plants would suggest impacts unique to nuclear power plants or coal-fired plants. Comparing nuclear and coal with a large industrial facility, such as a steel plant, would suggest differences between energy generating and non-energy generating facilities. Finally, the inclusion of a pristine or control community would address impacts dealing with industrial development in general.

Facility	Concern addressed
Nuclear power plant	impacts of nuclear plants
Coal-fired power plant	impact of power plants
Large industrial plant	impact of industrial development
Community with no plant	

Fig. 5. Social Impact Research Design.

This design would force researchers to broaden their approach to make better use of existing literature and empirical studies and could become an extremely cost-effective method of evaluating social impacts.

While the post-licensing study of Plymouth and Waterford has left many questions unanswered, it has also generated the basis for future research and hypothesis testing. As such, it represents an important first step in the examination of social impacts of nuclear power facilities and provides a useful benchmark for future research activities.

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1. F. N. Kerlinger, *Foundations of Behavioral Research,* New York: Holt, Rinehart and Winston, Inc., 1964, Chap. 21.

2. D. Katz, "Field Studies," In L. Festinger and D. Katz, *Research Methods in the Behavioral Sciences,* New York: Holt, Rinehart and Winston, Inc., 1953, pp. 75-83.

3. *Ibid,* Chap. 21.

4. See, for example, W. J. Goode and P. K. Hatt, *Methods in Social Research,* New York: McGraw Hill, 1952, Chap. 7, and D. T. Campbell and J. C. Stanley, *Experimental and Quasi-Experimental Designs for Research,* Chicago: Rand McNally, 1966, pp. 6.

5. See, for example, T. Gilmore and M. Duff, *The Sweetwater County Boom: A Challenge to Growth Management,* Denver, Colo.: Denver Research Institute, 1974.

6. Taxable capacity measures the relative ability of governmental jurisdictions to raise revenues under a given taxing structure (i.e., with a given definition of tax base). In the Plymouth and Waterford cases, the primary tax base is the assessed value of nonexempt real and personal property. Because the physical capital of the nuclear generation unit (under private ownership) is eligible for this type of taxation, construction of a power reactor significantly enhances the capacity of the host town to raise revenues. In other words, a given tax rate will generate a proportionately greater amount of revenues according to the percentage increase in the property tax base. It does not follow, however, that revenues will automatically rise, or that the existing tax rate multiplied times the capital investment adjusted to assessed value will predict future revenues accurately, since the town may choose to lower its tax rate in response to the increase in capacity. In doing so, it may recover the benefits (or a fraction of the benefits) of its capacity increase through the private sector, since effectively the lowering of the tax rate leaves additional dollars in the hands of taxpayers.

   It should be emphasized that public expenditures are not neutral in terms of job creation, and in fact, should stimulate the local economy approximately as much as private expenditures. Thus, while the increase in taxable capacity can potentially influence disposable income in the private sector by permitting a lowered tax rate, the "price" of public services is also halved (assuming a doubling of the tax base), a phenomenon that at least in theory should provide an impetus for additional expenditures.

   These "feedback" effects through which the local economy is enhanced are termed multiplying effects, and it is unlikely that public and private spending differ greatly in terms of stimulating the local

economy. However, it should be clear, if somewhat paradoxical, that the higher the local tax rate, the greater will be the impact on the local economy, because as the tax rate increases, the quantity of tax dollars "imported" from the power station also increase. Nevertheless, one should not conclude from this fact that an optimal strategy on the host community would be to continually increase its tax rate. This is because, while in the aggregate, the local economy would be benefited, this practice can also result in significant redistribution of local income, while simultaneously generating excess quantitites of public goods.

7. Local interviews with Mr. Lothrop Withington, Plymouth Tax Collector, and Mr. Kenneth Dimmock, Waterford Tax Collector, June 1975.

8. For a listing of licenses, see: Final Environmental Statement, Pilgrim Power Station, Docket No. 50-293, U.S. Atomic Energy Commission, May 1972. Final Environmental Statement, Millstone Nuclear Power Station, Docket No. 50-245 and 50-336, U.S. Atomic Energy Commission, June 1973.

9. The primary intervenor in Pilgrim Unit No. 1 hearings was William Abbott, a Boston lawyer and Plymouth resident.

10. "Pilgrim I Fish Kills Prompt New Investigation," *Old Colony Memorial*, April 19, 1973.

"AEC Orders Pilgrim I to Halt Operation Next Week," *Old Colony Memorial*, December 20, 1973.

"Pilgrim I Scrammed in Serious Incident," *Old Colony Memorial*, September 18, 1975.

11 "Utilities Place Faith in Technology," *New London Day*, May 1, 1975, p. 1.

12. "Nuclear Leak Causes Alarm at Millstone," *New London Day*. March 27, 1975, p. 6.

13. See, for example, R. Warren, *The Community in America*, Rand McNally and Co., Chicago, Ill., 1963. Also, S. Gottschalk, *Communities and Alternatives*, John Wiley and Sons, New York, 1975.

14. Suburban Boston Community Research Project, United Community Services of Metropolitan Boston, Boston, 1969, p. 2.

15. Massachusetts Department of Commerce and Development, *City and Town Monograph: Town of Plymouth*, August 1973.

16. U.S. Department of Commerce, Bureau of the Census, *United States Census of Population: 1970*, Vol. 1, *Characteristics of the Population, Massachusetts*.

17. These are two areas where change can be easily documented; other areas of change which might be explored are: 1) number of new industrial and commercial developments and 2) number of new business and residential telephone installations.

18. Plymouth Planning Board, Number of Residential and Commercial Permits Issued, Plymouth, Mass., 1975.

19. New and more extensive zoning ordinances were passed in the Plymouth Town Meeting in 1973.

20. See results of complete Plymouth Survey in Appendix B.

21. U.S. Department of Commerce, Bureau of the Census, *United States Census of Population: 1970*, Vol. 1, *Characteristics of the Population, Massachusetts.*

22. Annual Manpower Planning Report, Report to the Massachusetts Division of Employment Security, January 1975, Boston, Mass. 1975, p. 3.

23. During our interviews with Plymouth officials, many described increased work loads and new demands created by the influx of new residents.

24. Plymouth Planning Board, Plymouth School Department Summary, Plymouth, Mass., 1974.

25. Regional Planning Program Staff, *1970 Social Indicators: Southeastern Connecticut Planning Region*, Norwich Connecticut: Southeastern Connecticut Regional Planning Agency, 1973, p. 2.

26. United States Department of Commerce, Bureau of the Census, *United States Census of Population: 1970*, Vol. 1, *Characteristics of the Population, Connecticut.*

27. Waterford Planning and Zoning Commission, *Town of Waterford Zoning Regulations*, Waterford, Conn., 1972.

28. Waterford Planning and Zoning Commission, *Town of Waterford Zoning Regulations*, Waterford, Conn., 1972.

29. Town of Waterford, *Annual Reports*, 1974-1975.

30. Town of Waterford, *Annual Reports*, 1960-1975.

31. See results of Waterford Survey in Appendix B.

32. We are able to pinpoint improvements and extensions in individual services in both communities; however, we are unable to state that these improvements or extensions are directly due to the utility revenues.

33. The assessment ratio, i.e., the ratio of assessed value to true market value, commonly falls over time because tax assessors do not fully record market value changes for tax purposes. At regular intervals these changes are reconciled through a general revaluation, at which time all taxable parcels are reviewed in detail, and reassessed for tax purposes. During a revaluation, the assessment ratio usually rises, as assessed values are brought into line with market values. For a more detailed discussion of this topic, see D. J. Bjornstad, Fiscal Impacts Associated With Power Reactor Siting: A Paired Case Study, ORNL/NUREG-TM-86, Oak Ridge National Laboratory, January 1977.

34. To calculate this statistic, defined as the ratio of percentage change in the tax rate to the percentage change in the contribution of the plant to taxable capacity, one first divides the assessed values not associated with the station into the total assessments, arriving at a "price." This price indicates the total revenue yield from a dollar of locally raised revenues. It is equal to the station's value increases. The crude elasticity is then estimated by dividing the percentage change in the tax rate by the percentage change in the price ratio.

35. Data from local Plymouth officials on actual population change was unavailable for the years from 1973-1975.

36. "What is Waterford's Future?" *New London Day*, April 29, 1975.

37. Interview with Felix Carlino, Director of Public Works, Plymouth, Massachusetts, April 1975.

38. Town of Plymouth, *Annual Reports*, 1970-1975.

39. "Waterford Board OK's $23.8 Million in Sewer Bonding," *New London Day*, July 1, 1975.

40. See results of Waterford survey, Appendix B.

41. See, for example, "Rapid Growth from Energy Projects, Ideas for State and Local Action," U.S. Department of Housing and Urban Development, 1976.

42. Residents in the vicinity of Surry I Nuclear Plant, for example, in Surry, Virginia complained of excessive glare at night from construction activity.

43. Interviews with local residents and town officials in both communities described the impact of traffic on local secondary roads as being their primary concern during the construction period.

44. Interviews with local Plymouth residents, February 1975 to August 1975.

45. Builders and developers advertised in both the *Boston Globe* and other local newspapers on the South Shore of Boston. The advertisements stressed the relatively stable tax rate in Plymouth due to the favorable tax payments from Boston Edison.

46. While completely accurate figures on sale prices of housing in Plymouth during the late 1960s were unavailable, several realtors suggested that the average house price in Plymouth ranged from $13,500 - $15,000.

47. See Plymouth, *Annual Report*, 1974.

48. See Waterford, *Annual Reports*, 1967 and 1973.

49. James N. Dachtler, Unpublished Masters Thesis, Boston University, 1973.

50. Editorial, *Old Colony Memorial*, Plymouth, Mass., September 3, 1975.

51. Interviews with local public officials and community residents, Waterford and New London, Connecticut, February 1975 - June 1975.

52. Telephone interview with Chamber of Commerce officials in Plymouth, June 1975.

53. See results of Plymouth and Waterford Surveys, Appendix B.

54. L. Harris, et al., for Ebasco Services, Inc., *A Study of Citizens and Leadership Attitudes Toward Nuclear Power Development in the United States*, August 1975; and C. R. Schuller, et al., *Citizens' Views about the Proposed Hartsville Nuclear Power Plant*, ORNL-RUS-3, Oak Ridge National Laboratory, May 1975.

55. Bills introduced by Rep. James Collins (D-Amherst) in Massachusetts Legislature (1974) and Rep. Winfred Tanger (D-New London) in Connecticut Legislature (1974).

56. One of the most ambitious projects undertaken by the town of Plymouth has been the development of an industrial park on State Route 44. Sited on 212 acres of which approximately 120 acreas have roads, water, and sewer, the industrial park was initiated in 1967 with EDA assistance when Plymouth was recognized as a distressed area (unemployment rate approximating 10%). The development of the industrial park was viewed as one means of solving this high unemployment.

57. See, "Assessment of the Waterford Square Shopping Center," prepared by University of Rhode Island Graduate School of Planning, May 1975.

58. See, "Traffic Accident and Safety Study for the Town of Waterford, Connecticut," prepared by Scott Bander and Erik Brodin, Graduate School of Planning, University of Rhode Island, May 1975.

APPENDIX A

LIST OF INTERVIEWEES: PLYMOUTH, MASSACHUSETTS AREA AND WATERFORD, CONNECTICUT AREA

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Appendix A

List of Interviewees
Plymouth, Massachusetts Area

1.	David Tarantino	Chairman, Plymouth Board of Selectman
2.	Andrew Collas	Plymouth Town Clerk
3.	William Gault	Assistant Superintendent of Schools, Plymouth
4.	Lothrop Withington	Plymouth Assessor of Taxes
5.	Horace Genovese	Plymouth Tax Assessor, part-time
6.	Raymond Freiden	Plymouth Town Planner
7.	Albert Saunders	Plymouth Building Inspector
8.	Richard Dudman	Executive Secretary, Plymouth
9.	William Nazel	Teacher, Plymouth-Carver Regional High School
10.	Capt. Ernest Leonardi	Plymouth Police Department
11.	Capt. William Le Voye	Plymouth Fire Department
12.	John Loupos	Concerned Plymouth citizen
13.	Mimi Loupos	Concerned Plymouth citizen and Realtor
14.	Robert Dawley	Finance Officer, Plymouth Federal Savings and Loan
15.	Ronald Ferioli	Plymouth Realtor
16.	James Dachtler	Concerned Plymouth citizen
17.	William Abbott	Intervenor for Pilgrim Nuclear Station, Attorney and concerned Plymouth resident
18.	Mark Johnston	Editor: *Old Colony Memorial* newspaper, Plymouth
19.	Titus Pressler	Assistant Editor, *Old Colony Memorial* newspaper, Plymouth

20.	Felix Carlino	Director, Plymouth Public Works Department
21.	Herbert Pegman	Director, Massachusetts Division of Employment Security, Plymouth area
22.	Melvin Coombs	Director, Plymouth Industrial Development Commission
23.	Silas Wade	Former Chairman, Plymouth Conservation Commission
24.	Robert Tis	District Manager, Boston Edison Company
25.	James Davis	Senior Nuclear Engineer, Boston Edison Company, Boston
26.	Eric Savollinen	Director, SRPEDD Planning Region, Marion, Massachusetts
27.	Glen Kitteridge	Massachusetts State Department of Community Affairs, Boston
28.	Alvin Sanders	Director, Massachusetts State Planning Agency, Boston
29.	Karen O'Donnell	Reporter, *Old Colony Memorial* newspaper, Plymouth
30.	Donald Dobbins	United Community Planning Agency of Metropolitan Boston, Boston
31.	Doris French	Member, Plymouth Historical Society
32.	Thomas McDonald	Senior Labor Market Economist, Massachusetts Division of Employment Security, Boston
33.	Dr. James Mogilnicke	School Psychologist, Plymouth
34.	Dr. Julian Stauss	Demographer, Harvard School of Public Health, Cambridge
35.	Theodore White	Officer, Massachusetts Industrial Development Commission, Boston

List of Interviewees
Waterford, Connecticut

1.	Herbert Davis	First Selectman, Waterford
2.	Albert Swartzburg	Ex-Chairman, Waterford Planning and Zoning Commission
3.	Tony Sheridan	Town Planner, Waterford
4.	Richard Brooks	University of Rhode Island Professor and concerned Waterford citizen
5.	Sally Taylor	Connecticut College Professor and member of Waterford Conservation Commission
6.	Bruce Gathy	Coast Guard Academy Professor and member of Waterford Conservation Commission
7.	Le Roy Decker	Waterford Finance Officer
8.	Michael Garvey	Waterford Director of Public Works
9.	George Phillips	Waterford Building Inspector
10.	Kenneth Dimmock	Waterford Tax Assessor
11.	Janet Polinsky	Chairman, Waterford Planning and Zoning Commission
12.	Robert Goodwin	Botanist, Connecticut College
13.	Harold Nash	Chairman of Concerned Citizens
14.	Clarence Coogin	Assistant School Superintendent, Waterford
15.	Richard Erickson	Director of Southeastern Connecticut Regional Planning Agency
16.	Dean Avery	Executive Editor, *New London Day*, New London
17.	John Foley	Managing Editor, *New London Day*, New London
18.	Richard Polman	Columnist, *New London Day*
19.	Jeffrey Muise	Columnist, *New London Day*
20.	Dr. Bernard Faber	Sociologist, Connecticut College, New London
21.	Robert Flannigan	Assistant City Manager, New London

22.	Howard Lowenberg	Student, Connecticut College, New London
23.	James Perkins	Police Chief, Waterford
24.	Mary Wynn	Taxation Clerk, Connecticut State Department of Taxation, Hartford, Connecticut
25.	Bradford Chase	Director, Connecticut State Planning, Hartford, Connecticut
26.	John O'Dell	Director, State Projections and Vital Statistics, Hartford, Connecticut
27.	Elizabeth O'Hara	Connecticut State Department of Education, Hartford, Connecticut
28.	Richard Symonds	Connecticut State Planning Department, Hartford, Connecticut
29.	George Fox	Northeast Utilities, Hartford, Connecticut
30.	Mr. & Mrs. David Collins	Concerned citizens, Waterford
31.	David Winkler	Intervenor Millstone 1 & 2 and "Nader's Raider," Hartford, Connecticut
32.	Nicholas Pollini	Realtor, Waterford and New London

APPENDIX B

SURVEY RESULTS: PLYMOUTH, MASSACHUSETTS AND WATERFORD, CONNECTICUT

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POST LICENSING CASE STUDY - PLYMOUTH, MASSACHUSETTS SURVEY

HOW LONG HAVE YOU LIVED IN THIS TOWN?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
0 TO 4 YEARS	39	31.0	32.0
5 TO 9 YEARS	30	23.8	24.6
10+ YEARS	53	42.1	43.4
	4	3.2	MISSING
TOTAL	126	100.0	100.0

WHERE DID YOU LIVE BEFORE YOU MOVED HERE?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
BOSTON	58	46.0	46.0
OTHER	21	16.7	16.7
PLYMOUTH 10+	47	37.3	37.3
TOTAL	126	100.0	100.0

WHY DID YOU DECIDE TO MOVE HERE? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
FAMILY	12	9.5	15.2
JOB	14	11.1	17.7
ECONOMIC	12	9.5	15.2
ATTRACTIVENESS	25	19.8	31.6
HOUSING	16	12.7	20.3
	47	37.3	MISSING
TOTAL	126	100.0	100.0

WHY DID YOU DECIDE TO MOVE HERE? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
ECONOMIC	9	7.1	56.3
ATTRACTIVENESS	3	2.4	18.8
MISCELLANEOUS	4	3.2	25.0
	110	87.3	MISSING
TOTAL	126	100.0	100.0

HAS THE COMMUNITY CHANGED SINCE YOU MOVED HERE? IF SO,HOW? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
COMMUNITY HAS GROWN	45	35.7	83.3
MISCELLANEOUS	9	7.1	16.7
	72	57.1	MISSING
TOTAL	126	100.0	100.0

IF SO,HOW? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
COMMUNITY HAS GROWN	6	4.8	25.0
MISCELLANEOUS	18	14.3	75.0
	102	81.0	MISSING
TOTAL	126	100.0	100.0

HOW DO YOU FEEL ABOUT THIS TOWN AS A PLACE TO LIVE?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	39	31.0	31.2
GOOD	52	41.3	41.6
FAIR	6	4.8	4.8
POOR	4	3.2	3.2
ATTRACTIVE	14	11.1	11.2
MISCELLANEOUS	10	7.9	8.0
	1	0.8	MISSING
TOTAL	126	100.0	100.0

WHAT DO YOU LIKE ABOUT IT? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NATURAL BEAUTY	41	32.5	33.9
LOW TAXES	5	4.0	4.1
SCHOOLS	6	4.8	5.0
QUIET-PEACEFUL	8	6.3	6.6
PEOPLE	9	7.1	7.4
RURAL ATMOSPHERE	18	14.3	14.9
MISCELLANEOUS	34	27.0	28.1
	5	4.0	MISSING
	-------	-------	-------
TOTAL	126	100.0	100.0

WHAT DO YOU LIKE ABOUT IT? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NATURAL BEAUTY	14	11.1	23.7
LOW TAXES	5	4.0	8.5
SCHOOLS	5	4.0	8.5
PEOPLE	4	3.2	6.8
RURAL ATMOSPHERE	10	7.9	16.9
MISCELLANEOUS	21	16.7	35.6
	67	53.2	MISSING
	-------	-------	-------
TOTAL	126	100.0	100.0

WHAT DO YOU DISLIKE ABOUT IT? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO DISLIKES	23	18.3	18.7
TOURISTS	10	7.9	8.1
TRAFFIC - PARKING	15	11.9	12.2
GROWTH	12	9.5	9.8
POLITICIANS	7	5.6	5.7
MISCELLANEOUS	56	44.4	45.5
	3	2.4	MISSING
	-------	-------	-------
TOTAL	126	100.0	100.0

WHAT DO YOU DISLIKE ABOUT IT? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
TRAFFIC - PARKING	8	6.3	20.0
MISCELLANEOUS	32	25.4	80.0
	86	68.3	MISSING
	-------	-------	-------
TOTAL	126	100.0	100.0

WHAT CHANGES WOULD YOU MAKE IF YOU HAD THE CHANCE? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
STOP DEVELOPMENT	11	8.7	8.9
PROGRESS	17	13.5	13.7
COMMUNICATION	14	11.1	11.3
CLEAN UP POLITICS	7	5.6	5.6
MISCELLANEOUS	75	59.5	60.5
	2	1.6	MISSING
	-------	-------	-------
TOTAL	126	100.0	100.0

WHAT CHANGES WOULD YOU MAKE IF YOU HAD THE CHANCE? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
PROGRESS	4	3.2	12.1
BETTER POLICE	4	3.2	12.1
MISCELLANEOUS	25	19.8	75.8
	93	73.8	MISSING
	-------	-------	-------
TOTAL	126	100.0	100.0

HOW WOULD YOU RATE THIS TOWN AS A PLACE TO LIVE FOR YOUNG MARRIEDS?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	26	20.6	20.8
GOOD	63	50.0	50.4
AVERAGE	20	15.9	16.0
FAIR	13	10.3	10.4
POOR	3	2.4	2.4
	1	0.8	MISSING
	-------	-------	-------
TOTAL	126	100.0	100.0

HOW WOULD YOU RATE THIS TOWN AS A PLACE TO LIVE FOR THE ELDERLY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	9	7.1	7.2
GOOD	58	46.0	46.4
AVERAGE	31	24.6	24.8
FAIR	17	13.5	13.6
POOR	10	7.9	8.0
	1	0.8	MISSING
TOTAL	126	100.0	100.0

HOW WOULD YOU RATE THIS TOWN AS A PLACE TO LIVE FOR CHILDREN?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	29	23.0	23.2
GOOD	53	42.1	42.4
AVERAGE	27	21.4	21.6
FAIR	12	9.5	9.6
POOR	4	3.2	3.2
	1	0.8	MISSING
TOTAL	126	100.0	100.0

DO YOU THINK THIS TOWN SHOULD ENCOURAGE GROWTH AND DEVELOPMENT?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	59	46.8	48.4
NO	63	50.0	51.6
	4	3.2	MISSING
TOTAL	126	100.0	100.0

WHY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
SLOW PLANNED GROWTH	22	17.5	31.9
IMPROVE TAXES	12	9.5	17.4
MORE JOBS	11	8.7	15.9
MISCELLANEOUS	24	19.0	34.8
	57	45.2	MISSING
TOTAL	126	100.0	100.0

WHY NOT?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
TOO MUCH GROWTH NOW	29	23.0	49.2
TO KEEP BEAUTY	8	6.3	13.6
GOOD AS IT IS	7	5.6	11.9
MISCELLANEOUS	15	11.9	25.4
	67	53.2	MISSING
TOTAL	126	100.0	100.0

WOULD YOU SAY THAT CONSTRUCTION OR OPERATION OF THE NUCLEAR PLANT HAS AFFECTED YOUR LIFE IN ANY WAY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	49	38.9	39.2
NO	76	60.3	60.8
	1	0.8	MISSING
TOTAL	126	100.0	100.0

HOW? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
LOWER TAXES	28	22.2	60.9
MISCELLANEOUS	18	14.3	39.1
	80	63.5	MISSING
TOTAL	126	100.0	100.0

HOW? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
LOWER TAXES	75	59.5	97.4
MISCELLANEOUS	2	1.6	2.6
	49	38.9	MISSING
TOTAL	126	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR JOB? (POSITIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO EFFECT	55	43.7	44.4
SOME EFFECT	8	6.3	6.5
GREAT EFFECT	1	0.8	0.8
NO ANSWER	60	47.6	48.4
	2	1.6	MISSING
TOTAL	126	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR JOB? (NEGATIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
GREAT EFFECT	1	0.8	100.0
	125	99.2	MISSING
TOTAL	126	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS ABOUT THE COMMUNITY? (POSITIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO EFFECT	30	23.8	27.0
LITTLE EFFECT	4	3.2	3.6
SOME EFFECT	15	11.9	13.5
GREAT EFFECT	3	2.4	2.7
UNDECIDED	1	0.8	0.9
NO ANSWER	58	46.0	52.3
	15	11.9	MISSING
TOTAL	126	100.0	100.0

SPECIFICALLY,HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS ABOUT THE COMMUNITY? (NEGATIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
SOME EFFECT	10	7.9	76.9
GREAT EFFECT	3	2.4	23.1
	113	89.7	MISSING
TOTAL	126	100.0	100.0

SPECIFICALLY,HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS OF PERSONAL SAFETY? (POSITIVE OR NEUTRAL EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO EFFECT	44	34.9	40.7
LITTLE EFFECT	1	0.8	0.9
SOME EFFECT	1	0.8	0.9
UNDECIDED	3	2.4	2.8
NO ANSWER	59	46.8	54.6
	18	14.3	MISSING
TOTAL	126	100.0	100.0

SPECIFICALLY,HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS OF PERSONAL SAFETY? (NEGATIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
LITTLE EFFECT	3	2.4	17.6
SOME EFFECT	5	4.0	29.4
GREAT EFFECT	2	1.6	11.8
UNDECIDED	7	5.6	41.2
	109	86.5	MISSING
TOTAL	126	100.0	100.0

IF YOU HAD IT TO DO OVER AGAIN, WOULD YOU PERMIT CONSTRUCTION OF THE NUCLEAR PLANT HERE?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	89	70.6	76.1
NO	28	22.2	23.9
	9	7.1	MISSING
TOTAL	126	100.0	100.0

WHY DO YOU SAY THIS? YES

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NEED POWER,TAXES	9	7.1	10.0
LOWER TAXES	22	17.5	24.4
FAVOR NUCLEAR ENERGY	5	4.0	5.6
FAVOR PROGRESS	7	5.6	7.8
THINK PLANT IS SAFE	5	4.0	5.6
SEVERAL REASONS	8	6.3	8.9
NO BAD EFFECTS	11	8.7	12.2
ECONOMIC BENEFIT	5	4.0	5.6
MORE JOBS	6	4.8	6.7
NO SPECIFIC REASON	5	4.0	5.6
MISCELLANEOUS	7	5.6	7.8
	36	28.6	MISSING
TOTAL	126	100.0	100.0

WHY DO YOU SAY THIS? NO

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
PERSONAL DANGER	6	4.8	21.4
MISCELLANEOUS	22	17.5	78.6
	98	77.8	MISSING
TOTAL	126	100.0	100.0

GENERALLY SPEAKING,HOW DO YOU FEEL ABOUT THE JOB BOSTON EDISON IS DOING?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	10	7.9	8.2
VERY GOOD	6	4.8	4.9
GOOD	21	16.7	17.2
AVERAGE	12	9.5	9.8
FAIR	7	5.6	5.7
POOR	2	1.6	1.6
UNDECIDED	24	19.0	19.7
NO OPINION	36	28.6	29.5
MISCELLANEOUS	4	3.2	3.3
	4	3.2	MISSING
TOTAL	126	100.0	100.0

HOW CLOSE DO YOU FEEL TO NEWCOMERS TO THE COMMUNITY?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	23	18.3	19.0
	2	9	7.1	7.4
	3	10	7.9	8.3
	4	12	9.5	9.9
	5	24	19.0	19.8
	6	14	11.1	11.6
	7	5	4.0	4.1
	8	8	6.3	6.6
	9	2	1.6	1.7
VERY CLOSE	10	14	11.1	11.6
		5	4.0	MISSING
TOTAL		126	100.0	100.0

HOW CLOSE DO YOU FEEL TO PERSONS WHO LIVE IN DIFFERENT NEIGHBORHOODS?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	12	9.5	10.0
	2	6	4.8	5.0
	3	8	6.3	6.7
	4	10	7.9	8.3
	5	25	19.8	20.8
	6	13	10.3	10.8
	7	7	5.6	5.8
	8	15	11.9	12.5
	9	13	10.3	10.8
VERY CLOSE	10	11	8.7	9.2
		6	4.8	MISSING
		-------	-------	-------
	TOTAL	126	100.0	100.0

HOW CLOSE DO YOU FEEL TO PUBLIC OFFICIALS?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	35	27.8	30.7
	2	11	8.7	9.6
	3	16	12.7	14.0
	4	6	4.8	5.3
	5	11	8.7	9.6
	6	8	6.3	7.0
	7	9	7.1	7.9
	8	8	6.3	7.0
	9	3	2.4	2.6
VERY CLOSE	10	7	5.6	6.1
		12	9.5	MISSING
		-------	-------	-------
	TOTAL	126	100.0	100.0

HOW CLOSE DO YOU FEEL TO PERSONS
WITH DIFFERENT OCCUPATIONS?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	3	2.4	2.4
	2	7	5.6	5.7
	3	7	5.6	5.7
	4	5	4.0	4.1
	5	14	11.1	11.4
	6	9	7.1	7.3
	7	9	7.1	7.3
	8	19	15.1	15.4
	9	22	17.5	17.9
VERY CLOSE	10	28	22.2	22.8
		3	2.4	MISSING
		-------	-------	-------
	TOTAL	126	100.0	100.0

WHAT IS YOUR PRESENT OCCUPATION?

		ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
PROFESSIONAL		3	2.4	2.4
FARMER		13	10.3	10.4
MANAGER		5	4.0	4.0
CLERICAL		14	11.1	11.2
SALES		4	3.2	3.2
CRAFTSMAN		15	11.9	12.0
BLUE COLLAR		11	8.7	8.8
SERVICE		9	7.1	7.2
STUDENT		3	2.4	2.4
HOUSEWIFE		24	19.0	19.2
RETIRED		16	12.7	12.8
MILITARY		2	1.6	1.6
UNEMPLOYED		6	4.8	4.8
		1	0.8	MISSING
		-------	-------	-------
	TOTAL	126	100.0	100.0

IN WHAT YEAR WERE YOU BORN?
(THIS QUESTION WAS RECODED TO GIVE AGE).

		ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
18 TO 29		37	29.4	29.8
30 TO 39		38	30.2	30.6
40 TO 49		20	15.9	16.1
50+		29	23.0	23.4
		2	1.6	MISSING
		-------	-------	-------
	TOTAL	126	100.0	100.0

DO YOU IDENTIFY YOURSELF WITH A SPECIFIC GROUP IN THE COMMUNITY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	43	34.1	34.4
NO	82	65.1	65.6
	1	0.8	MISSING
TOTAL	126	100.0	100.0

IF YES, WHICH ONES?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
SOCIAL	6	4.8	4.8
PUBLIC AFFAIRS	8	6.3	6.4
CHURCH GROUPS	12	9.5	9.6
MISCELLANEOUS	13	10.3	10.4
NO SPECIFIC GROUP	86	68.3	68.8
	1	0.8	MISSING
TOTAL	126	100.0	100.0

SEX

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
MALE	56	44.4	44.8
FEMALE	67	53.2	53.6
HUSBAND&WIFE	2	1.6	1.6
	1	0.8	MISSING
TOTAL	126	100.0	100.0

POST LICENSING CASE STUDY - WATERFORD, CONNECTICUT SURVEY

HOW LONG HAVE YOU LIVED IN THIS TOWN?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
0 TO 4 YEARS	23	12.6	12.8
5 TO 9 YEARS	27	14.8	15.1
10+ YEARS	129	70.9	72.1
	3	1.6	MISSING
TOTAL	182	100.0	100.0

WHERE DID YOU LIVE BEFORE YOU MOVED HERE?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
IN CONN.	37	20.3	20.3
OTHER	17	9.3	9.3
WATERFORD 10+	128	70.3	70.3
TOTAL	182	100.0	100.0

WHY DID YOU DECIDE TO MOVE HERE? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
FAMILY	10	5.5	18.5
JOB	12	6.6	22.2
ECONOMIC	3	1.6	5.6
ATTRACTIVENESS	16	8.8	29.6
HOUSING	13	7.1	24.1
	128	70.3	MISSING
TOTAL	182	100.0	100.0

WHY DID YOU DECIDE TO MOVE HERE? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
JOB	6	3.3	40.0
ECONOMIC	1	0.5	6.7
ATTRACTIVENESS	2	1.1	13.3
HOUSING	3	1.6	20.0
MISCELLANEOUS	3	1.6	20.0
	167	91.8	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

HAS THE COMMUNITY CHANGED SINCE YOU MOVED HERE? IF SO,HOW? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
GROWTH	13	7.1	31.0
NO CHANGES	23	12.6	54.8
MISCELLANEOUS	6	3.3	14.3
	140	76.9	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

IF SO,HOW? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
GROWTH	5	2.7	55.6
MISCELLANEOUS	4	2.2	44.4
	173	95.1	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

HOW DO YOU FEEL ABOUT THIS TOWN AS A PLACE TO LIVE?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	82	45.1	46.9
GOOD	55	30.2	31.4
AVERAGE	7	3.8	4.0
FAIR	1	0.5	0.6
POOR	7	3.8	4.0
ATTRACTIVE	22	12.1	12.6
MISCELLANEOUS	1	0.5	0.6
	7	3.8	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

WHAT DO YOU LIKE ABOUT IT? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
GOOD PLACE TO WORK	4	2.2	2.3
GOOD NEIGHBORHOOD	5	2.7	2.9
EVERYTHING	17	9.3	9.9
LOW TAXES	32	17.6	18.6
SCHOOLS	26	14.3	15.1
QUIET - PEACEFUL	13	7.1	7.6
PEOPLE	5	2.7	2.9
RURAL ATMOSPHERE	13	7.1	7.6
LOCATION	26	14.3	15.1
MISCELLANEOUS	31	17.0	18.0
	10	5.5	MISSING
TOTAL	182	100.0	100.0

WHAT DO YOU LIKE ABOUT IT? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
LOW TAXES	18	9.9	15.8
SCHOOLS	14	7.7	12.3
QUIET - PEACEFUL	3	1.6	2.6
PEOPLE	8	4.4	7.0
RURAL ATMOSPHERE	6	3.3	5.3
GOOD GOVERNMENT	4	2.2	3.5
POLICE - FIRE	4	2.2	3.5
LOCATION	18	9.9	15.8
RIVER	6	3.3	5.3
SERVICES	5	2.7	4.4
MISCELLANEOUS	28	15.4	24.6
	68	37.4	MISSING
TOTAL	182	100.0	100.0

WHAT DO YOU DISLIKE ABOUT IT? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO DISLIKES	74	40.7	46.2
SEWAGE	11	6.0	6.9
TRAFFIC	12	6.6	7.5
POLITICIANS	10	5.5	6.3
MISCELLANEOUS	53	29.1	33.1
	22	12.1	MISSING
TOTAL	182	100.0	100.0

WHAT DO YOU DISLIKE ABOUT IT? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
MISCELLANEOUS	17	9.3	100.0
	165	90.7	MISSING
TOTAL	182	100.0	100.0

WHAT CHANGES WOULD YOU MAKE IF YOU HAD THE CHANCE? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
COMMUNICATION	42	23.1	26.4
BETTER SCHOOLS	14	7.7	8.8
GOVERNMENT	10	5.5	6.3
COMMUNITY CENTER	9	4.9	5.7
SEWERAGE	25	13.7	15.7
MISCELLANEOUS	59	32.4	37.1
	23	12.6	MISSING
TOTAL	182	100.0	100.0

WHAT CHANGES WOULD YOU MAKE IF YOU HAD THE CHANCE? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
COMMUNITY CENTER	11	6.0	29.7
SEWERAGE	5	2.7	13.5
MISCELLANEOUS	21	11.5	56.8
	145	79.7	MISSING
TOTAL	182	100.0	100.0

HOW WOULD YOU RATE THIS TOWN AS A PLACE TO LIVE FOR YOUNG MARRIEDS?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	67	36.8	38.5
GOOD	73	40.1	42.0
AVERAGE	25	13.7	14.4
FAIR	5	2.7	2.9
POOR	4	2.2	2.3
	8	4.4	MISSING
TOTAL	182	100.0	100.0

HOW WOULD YOU RATE THIS TOWN AS A PLACE TO LIVE FOR THE ELDERLY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	33	18.1	19.2
GOOD	53	29.1	30.8
AVERAGE	57	31.3	33.1
FAIR	20	11.0	11.6
POOR	9	4.9	5.2
	10	5.5	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

HOW WOULD YOU RATE THIS TOWN AS A PLACE TO LIVE FOR CHILDREN?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT	72	39.6	40.2
GOOD	90	49.5	50.3
AVERAGE	15	8.2	8.4
FAIR	2	1.1	1.1
	3	1.6	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

DO YOU THINK THIS TOWN SHOULD ENCOURAGE GROWTH AND DEVELOPMENT?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	127	69.8	70.9
NO	52	28.6	29.1
	3	1.6	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

WHY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
SLOW - PLANNED	28	15.4	23.5
IMPROVE TAXES	15	8.2	12.6
MORE BUSINESS	13	7.1	10.9
ROOM TO DEVELOP	10	5.5	8.4
GROWTH IS GOOD	37	20.3	31.1
MISCELLANEOUS	16	8.8	13.4
	63	34.6	MISSING
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TOTAL	182	100.0	100.0

WHY NOT?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
TOO MUCH GROWTH NOW	5	2.7	9.6
SPOILS BEAUTY	5	2.7	9.6
GOOD AS IT IS	22	12.1	42.3
AVOID OVERCROWDING	6	3.3	11.5
MISCELLANEOUS	14	7.7	26.9
	130	71.4	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

WOULD YOU SAY THAT CONSTRUCTION OR
OPERATION OF THE NUCLEAR PLANT
HAS AFFECTED YOUR LIFE IN ANY WAY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	72	39.6	40.0
NO	108	59.3	60.0
	2	1.1	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

HOW? ANSWER 1

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
LOWER TAXES	39	21.4	54.2
EMPLOYED AT PLANT	10	5.5	13.9
ECONOMIC BENEFITS	4	2.2	5.6
CONCERNED - SAFETY	5	2.7	6.9
MORE TRAFFIC	5	2.7	6.9
MISCELLANEOUS	9	4.9	12.5
	110	60.4	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

HOW? ANSWER 2

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
MISCELLANEOUS	5	2.7	100.0
	177	97.3	MISSING
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TOTAL	182	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR JOB?
(POSITIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO EFFECT	55	30.2	75.3
LITTLE EFFECT	2	1.1	2.7
SOME EFFECT	4	2.2	5.5
GREAT EFFECT	12	6.6	16.4
	109	59.9	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR JOB?
(NEGATIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
	182	100.0	MISSING
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TOTAL	182	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS ABOUT THE COMMUNITY?
(POSITIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO EFFECT	45	24.7	65.2
LITTLE EFFECT	1	0.5	1.4
SOME EFFECT	17	9.3	24.6
GREAT EFFECT	6	3.3	8.7
	113	62.1	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS ABOUT THE COMMUNITY?
(NEGATIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
SOME EFFECT	4	2.2	80.0
GREAT EFFECT	1	0.5	20.0
	177	97.3	MISSING
TOTAL	182	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS OF PERSONAL SAFETY?
(POSITIVE OR NEUTRAL EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NO EFFECT	35	19.2	58.3
LITTLE EFFECT	1	0.5	1.7
UNDECIDED	1	0.5	1.7
NO DANGER	23	12.6	38.3
	122	67.0	MISSING
TOTAL	182	100.0	100.0

SPECIFICALLY, HOW DO YOU SAY CONSTRUCTION AND OPERATION OF THE PLANT HAS AFFECTED YOUR FEELINGS OF PERSONAL SAFETY?
(NEGATIVE EFFECTS)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
SOME EFFECT	6	3.3	40.0
FEEL UNSAFE	9	4.9	60.0
	167	91.8	MISSING
TOTAL	182	100.0	100.0

IF YOU HAD IT TO DO OVER AGAIN,
WOULD YOU PERMIT CONSTRUCTION
OF THE NUCLEAR PLANT HERE?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	159	87.4	93.5
NO	11	6.0	6.5
	12	6.6	MISSING
TOTAL	182	100.0	100.0

WHY DO YOU SAY THIS? YES

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
CHEAPER POWER	15	8.2	9.7
LOWER TAXES	33	18.1	21.3
THINK PLANT IS SAFE	6	3.3	3.9
SEVERAL REASONS	12	6.6	7.7
NO BAD EFFECTS	17	9.3	11.0
ECONOMIC BENEFIT	15	8.2	9.7
MORE JOBS	20	11.0	12.9
NO SPECIFIC REASON	8	4.4	5.2
NECESSARY	6	3.3	3.9
LIMITED EXPANSION	6	3.3	3.9
MISCELLANEOUS	17	9.3	11.0
	27	14.8	MISSING
TOTAL	182	100.0	100.0

WHY DO YOU SAY THIS? NO

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
PERSONAL DANGER	6	3.3	54.5
MISCELLANEOUS	5	2.7	45.5
	171	94.0	MISSING
TOTAL	182	100.0	100.0

GENERALLY SPEAKING, HOW DO YOU FEEL ABOUT THE JOB NORTHEAST UTILITIES IS DOING?

		ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
EXCELLENT		1	0.5	0.6
VERY GOOD		19	10.4	11.3
GOOD		36	19.8	21.4
AVERAGE		34	18.7	20.2
FAIR		9	4.9	5.4
POOR		6	3.3	3.6
NO OPINION		23	12.6	13.7
MISCELLANEOUS		40	22.0	23.8
		14	7.7	MISSING
		-------	-------	-------
	TOTAL	182	100.0	100.0

HOW CLOSE DO YOU FEEL TO NEWCOMERS TO THE COMMUNITY?

		CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL		1	31	17.0	17.4
		2	14	7.7	7.9
		3	15	8.2	8.4
		4	1	0.5	0.6
		5	30	16.5	16.9
		6	23	12.6	12.9
		7	6	3.3	3.4
		8	23	12.6	12.9
		9	14	7.7	7.9
VERY CLOSE		10	21	11.5	11.8
			4	2.2	MISSING
			-------	-------	-------
	TOTAL		182	100.0	100.0

HOW CLOSE DO YOU FEEL TO PERSONS WHO LIVE IN DIFFERENT NEIGHBORHOODS?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	20	11.0	11.2
	2	7	3.8	3.9
	3	6	3.3	3.4
	4	6	3.3	3.4
	5	33	18.1	18.5
	6	22	12.1	12.4
	7	9	4.9	5.1
	8	16	8.8	9.0
	9	30	16.5	16.9
VERY CLOSE	10	29	15.9	16.3
		4	2.2	MISSING
		-------	-------	-------
	TOTAL	182	100.0	100.0

HOW CLOSE DO YOU FEEL TO PUBLIC OFFICIALS?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	44	24.2	25.3
	2	24	13.2	13.8
	3	15	8.2	8.6
	4	15	8.2	8.6
	5	24	13.2	13.8
	6	19	10.4	10.9
	7	6	3.3	3.4
	8	5	2.7	2.9
	9	10	5.5	5.7
VERY CLOSE	10	12	6.6	6.9
		8	4.4	MISSING
		-------	-------	-------
	TOTAL	182	100.0	100.0

HOW CLOSE DO YOU FEEL TO PERSONS
WITH DIFFERENT OCCUPATIONS?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	6	3.3	3.4
	2	12	6.6	6.7
	3	11	6.0	6.1
	4	5	2.7	2.8
	5	14	7.7	7.8
	6	19	10.4	10.6
	7	13	7.1	7.3
	8	26	14.3	14.5
	9	20	11.0	11.2
VERY CLOSE	10	53	29.1	29.6
		3	1.6	MISSING
	TOTAL	182	100.0	100.0

HOW CLOSE DO YOU FEEL TO PEOPLE
WHO LIVE IN NEW LONDON?

	CODE	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
NOT CLOSE AT ALL	1	18	9.9	10.1
	2	17	9.3	9.5
	3	7	3.8	3.9
	4	7	3.8	3.9
	5	18	9.9	10.1
	6	13	7.1	7.3
	7	16	8.8	8.9
	8	15	8.2	8.4
	9	17	9.3	9.5
VERY CLOSE	10	51	28.0	28.5
		3	1.6	MISSING
	TOTAL	182	100.0	100.0

WHAT IS YOUR PRESENT OCCUPATION?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
PROFESSIONAL	29	15.9	16.1
MANAGER	4	2.2	2.2
CLERICAL	13	7.1	7.2
SALES	10	5.5	5.6
CRAFTSMAN	22	12.1	12.2
BLUE COLLAR	12	6.6	6.7
SERVICE	8	4.4	4.4
OTHER LABOR	3	1.6	1.7
STUDENT	1	0.5	0.6
HOUSEWIFE	59	32.4	32.8
RETIRED	16	8.8	8.9
MILITARY	1	0.5	0.6
UNEMPLOYED	2	1.1	1.1
	2	1.1	MISSING
	-------	-------	-------
TOTAL	182	100.0	100.0

IN WHAT YEAR WERE YOU BORN?
(THIS QUESTION WAS RECODED TO GIVE AGE)

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
18 TO 29	14	7.7	8.0
30 TO 39	36	19.8	20.7
40 TO 49	50	27.5	28.7
50+	74	40.7	42.5
	8	4.4	MISSING
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TOTAL	182	100.0	100.0

DO YOU IDENTIFY YOURSELF WITH A
SPECIFIC GROUP IN THE COMMUNITY?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
YES	61	33.5	34.5
NO	116	63.7	65.5
	5	2.7	MISSING
TOTAL	182	100.0	100.0

IF YES, WHICH ONES?

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
SOCIAL	15	8.2	8.3
PUBLIC SERVICE	12	6.6	6.7
CHURCH GROUP	16	8.8	8.9
MISCELLANEOUS	20	11.0	11.1
NO SPECIFIC GROUP	117	64.3	65.0
	2	1.1	MISSING
TOTAL	182	100.0	100.0

SEX

	ABSOLUTE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	ADJUSTED FREQUENCY (PERCENT)
MALE	84	46.2	46.7
FEMALE	96	52.7	53.3
	2	1.1	MISSING
TOTAL	182	100.0	100.0

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